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Contract Number N62470-11-D-8013

CTO WE15

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List of Acronyms and Abbreviations

AOC Area of Concern bgs below ground surface

COR Continuously Operating Reference

Delta Delta Well and Pump
DoD Department of Defense

ELAP Environmental Laboratory Accreditation Program EPA Environmental Protection Agency, United States

ER Environmental Restoration

ft feet

GOCO Government-Owned Contractor-Operated

GPS Global Positioning System
IDW Investigation Derived Waste
Katahdin Katahdin Analytical Services, Inc

lbs pounds

NAD North American Datum

NAVD North American Vertical Datum

NAVFAC Naval Facilities Engineering Command

NG Northrop Grumman

NTU Nephlometric Turbidity Units

NWIRP Naval Weapons Industrial Reserve Plant

NYSDEC New York State Department of Environmental Conservation

OU Operable Unit

PCBs Polychlorinated Biphenyls
PID Photoionization Detector

POTW Publicly Owned Treatment Works

PVC Polyvinylchloride

PPE Personal Protective Equipment
SAP Sampling and analysis plan
SVOC Semivolatile Organic Compounds

TCE Trichloroethene

TCL Target Compound List

TCLP Toxicity Characteristic Leaching Procedure

TOC Total Organic Carbon

TOGS Technical and Operational Guidance Series

TPH Total Petroleum Hydrocarbons
UFP United Federal Programs
VOC Volatile Organic Compounds

1.0 PROJECT BACKGROUND

Resolution Consultants has prepared this Data Summary Report for the Naval Facilities Engineering Command, Mid-Atlantic under contract task order WE15 Contract N62470-11-D-8013. This report describes installation activities associated with replacement monitoring wells BPOW4-1R and BPOW4-2R in 2014 for the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Operable Unit (OU) 2 Site 1 offsite plume. NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1).

1.1 Scope and Objectives

This report provides information on the installation of replacement monitoring wells BPOW4-1R and BPOW4-2R. Monitoring wells BPOW4-1 and BPOW4-2 were replaced since both wells failed integrity testing. Wells BPOW4-1R and BPOW4-2R were completed to 697 feet (ft) and 770 ft below ground surface (bgs), respectively. The locations of these wells are shown in Figure 2.

Field tasks were conducted in 2014 in accordance with the *United Federal Programs Sampling and Analysis Plan (UFP SAP)*, Bethpage, New York and the UFP SAP Addendum Installation of Vertical Profile Borings and Monitoring Wells (Resolution Consultants, 2013) and the *Abbreviated Workplan for Outpost Monitoring Well Reinstallation (BPOW4-1R and 4-2R*) (Resolution Consultants 2014). The field investigation included: drilling; geophysical logging; installing two replacement monitoring wells; groundwater sampling; and surveying.

Documentation of these activities is included in the Appendices of this report.

1.2 Site History

NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Since its inception in 1941, the plant's primary mission was the research prototyping, testing, design, engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP included four plants used for assembly and prototype testing, a group of quality control laboratories, two warehouse complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings.

The Navy's property, totaling 109.5 acres, was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. Prior to 2002, the NWIRP property was bordered on the north, west, and south by current or former NG facilities, and on the east by a residential neighborhood. By March 2008, approximately 100 acres of NWIRP

property were transferred to Nassau County in three separate actions. The remaining 9 acres and access easements were retained by the Navy to continue remedial efforts at Environmental Restoration (ER) Site 1 – Former Drum Marshalling Area and Site 4 – Former Underground Storage Tanks (Area of Concern [AOC] 22). A parcel of land connecting the two sites was also retained. Currently, the 9-acre parcel of NWIRP is bordered on the east by the residential neighborhood and on the north, south, and west by Steel Los and Nassau County properties. Access to the NWIRP is from South Oyster Bay Road.

1.3 Geology and Hydrogeology

Overburden at the site consists of well over 1,000 ft of Cretaceous deposits overlying crystalline bedrock of the Hartland Formation. Overburden is divided into four geologic units: the upper Pleistocene deposits, the Magothy Formation, the clay member of the Raritan Formation ("Raritan Clay") and the Lloyd Sand member of the Raritan Formation ("Lloyd Sand") (Geraghty and Miller, 1994).

The Upper Pleistocene deposits range in thickness from approximately 50 to 100 ft and consists of till and outwash deposits of medium to coarse sand and gravel with lenses of fine sand, silt and clay (Smolensky and Feldman, 1990); these deposits form the Upper Glacial Aquifer. Directly underlying this unit is the Magothy Formation with a thickness of 650 to 900 ft bgs observed onsite. The Magothy is characterized by fine to medium sands and silts interbedded with zones of clays, silty sands and sandy clays. Sand and gravel lenses are found in some areas between depths of 600 and 875 ft bgs; these deposits form the Magothy Aquifer.

Investigations performed by the Navy since 2012 indicate that the bottom of the Magothy (top of the Raritan Clay) can extend to depths of 700 to greater than 1,000 ft bgs. The top of the Raritan Clay deepens to the south southeast, as evidenced by clay depths of 1,000 ft bgs (or more) in borings installed offsite. The Raritan Clay Unit is of continental origin and consists of clay, silty clay, clayey silt, and fine silty sand. This member acts as a confining layer over the Lloyd Sand Unit. The Lloyd Sand Unit is also of continental origin, having been deposited in a large fresh water lacustrine environment. The material consists of fine to coarse-grained sands, gravel, inter-bedded clay, and silty sand. These deposits form the Lloyd Aquifer.

The Upper Glacial Aquifer and the Magothy Aquifer comprise the aquifers of interest at the NWIRP. Regionally, these formations are generally considered to form a common, interconnected aquifer as

the coarse nature of each unit near their contact and the lack of any regionally confining clay unit allows for the unrestricted flow of groundwater between the formations.

The Magothy Aquifer is the major source of public water in Nassau County. The most productive water bearing zones are the discontinuous lenses of sand and gravel that occur within the siltier matrix. The major water-bearing zones are course sand and gravel lenses located in the lower portion of the Magothy. The Magothy Aquifer is commonly regarded to function overall as an unconfined aquifer at shallow depths and a confined aquifer at deeper depths. The drilling program at the NWIRP has revealed that clay zones beneath the facility are common but laterally discontinuous. No confining clay units of facility-wide extent have been encountered.

Groundwater is encountered at a depth of approximately 50 ft bgs at the facility. Historically, because of pumping and recharge at the facility, groundwater depths have been measured to range from 40 to 60 ft bgs. The regional groundwater flow in the area is to the south-southeast.

2.0 FIELD PROGRAM

Field investigation activities at BPOW4-1 and BPOW4-2 consisted of integrity testing, attempted rehabilitation and decommissioning. As a result of the failed integrity testing at BPOW4-1 and BPOW4-2, these wells were replaced with BPOW4-1R and BPOW4-2R.

Field investigation activities at BPOW4-1R/BPOW4-2R consisted of drilling, sampling, soil/groundwater analysis, geophysical logging, and surveying. Gamma logging was conducted in the borehole for BPOW4-2R. Drilling during this investigation was performed by Delta Well and Pump Company (Delta) of Ronkonkoma, New York. A description of these tasks is provided below.

2.1 Integrity testing, attempted rehabilitation and decommissioning of BPOW4-1 and BPOW4-2

Wells BPOW4-1 and BPOW4-2 were installed in 2003. Appendix A includes boring and gamma logs and well construction diagrams. Analysis of groundwater samples collected from these wells in May 2013 detected concentrations of Freon above the New York State Department of Environmental Conservation Technical and Operational Guidance Series (TOGS) guidance value. In order to determine if the well packers were functioning properly or if cracks had occurred in the well casing, integrity testing was conducted on wells BPOW4-1 and BPOW4-2 in July and September 2013. Appendix B includes a memo describing the integrity testing and results. Both wells failed the integrity testing and it was decided to rehabilitate the wells.

An attempt to install two-inch diameter wells within the existing four-inch wells in February 2014 was unsuccessful. A loss of grout between the inner two-inch and existing outer four-inch casing in BPOW4-2 indicated a possible crack in the original casing where grout was escaping; therefore efforts to rehabilitate BPOW4-2 were abandoned. Retrieval of the packer setup in BPOW4-1 may have resulted in a portion of the well collapsing; therefore efforts to rehabilitate BPOW4-1 were also abandoned. Appendix B includes a Memo describing the rehabilitation attempt.

As a result of the failed integrity testing, wells BPOW4-1 and BPOW4-2 were decommissioned by grouting in place on Sept. 23 and Sept 24, 2014, respectively, consistent with a protocol included in Appendix B. The pre-existing flush mounted curb boxes and surrounding concrete pad were broken apart and removed from the well sites. A mixture of cement, bentonite, and water was pumped through one- inch poly tubing from the bottom to the top of each well. Materials used at the BPOW4-1 well included twenty-four bags of cement (94 pounds [lbs] each) and 100 lbs of

Bentonite. At the BPOW4-2 site, sixteen bags of cement and 65 pounds of bentonite were used to plug the well.

The surface casing was cut approximately 2 feet below ground surface and slip caps were installed over the riser pipes. The well sites were restored with topsoil and seeded.

2.2 Drilling and Well Construction of Replacement wells BPOW4-1R and BPOW4-2R

Replacement monitoring wells BPOW4-1R and BPOW4-2R were installed between August and October 2014. Depths of monitoring wells BPOW4-1R and BPOW4-2R are 697 and 770 feet, respectively. Locations are shown on Figure 2. The wells were installed using mud rotary drilling techniques. Boring and well construction details are summarized in Tables 1 and 2. Boring logs with lithologic descriptions of the well screen interval as well as well construction diagrams are included in Appendix C.

The initial attempt to install BPOW4-1R failed due to the loss of drilling equipment (a portion of the hammer and split spoon sampler). The boring was grouted up to 706 feet bgs. Within this same boring, well BPOW4-1R was re-drilled using a 50K Gefko mud rotary rig by Delta from July 2014 to August 19, 2014 to a depth of 707 ft bgs and was constructed with 53 feet of 10-inch diameter steel surface casing. Monitoring well BPOW4-1R was installed using 4-inch diameter, schedule 80, polyvinylchloride (PVC) riser pipe, 40 feet of 0.010-slot PVC screen (652'-692') and a five-foot sump for a total depth of 697 ft. bgs. Stainless steel centralizers were attached to the bottom of the sump and to the PVC riser pipe located above the screen to stabilize the well inside the borehole. A coarse sand pack was placed beneath the well and in the annular space around the PVC screen. Additional fine sand was installed above the coarse sand to a depth of 602 ft bgs. Bentonite grout was tremied from the top of the filter sand pack to the ground surface.

The initial attempt to install BPOW4-2R failed due to the loss of drilling equipment (drilling rods). As a result, the borehole was grouted to grade. Monitoring well BPOW4-2R was moved approximately 200 feet north of the original BPOW4-2 location and was drilled from September 25 to October 20, 2014. The borehole was advanced to a depth of 785' and a total of 18 split spoon samples were collected from ground surface to the bottom of the boring (Table 1). Samples were logged by the field geologist and screened for Volatile Organic Compounds (VOCs) utilizing a photoionization detector (PID). Gamma logging was completed on the open borehole by Aqua Terra Geophysics, Inc. A copy of the gamma log report is included in Appendix C.

Monitoring well BPOW4-2R was installed using 53 feet of 10-inch diameter steel surface casing, 4-inch diameter, schedule 80, PVC riser pipe, 40 feet of 0.010-slot PVC screen (725'-765') and a five-foot sump for a total depth of 770 ft. bgs. Stainless steel centralizers were attached to the bottom of the sump and to the PVC riser pipe located above the screen to stabilize the well inside the borehole. A coarse sand pack was placed beneath the well and in the annular space around the PVC screen. Additional fine sand was installed above the coarse sand to a depth of 702 ft bgs. Bentonite grout was tremied from the top of the filter sand pack to the ground surface.

Two soil samples were collected for laboratory analysis for total organic carbon (TOC) by Environmental Protection Agency (EPA) series SW-846 method 9060A. During drilling, air sampling was conducted under a Community Air Monitoring Plan. One air sample was collected using Summa canisters and submitted for laboratory analysis by EPA Method TO-15. All analyses were performed or sub-contracted by Katahdin. Data validation of both TOC and air data was performed by Resolution Consultants. Data validation packages and analytical data tables are included in Appendix C.

Both wells were completed at the surface with a 12-inch diameter steel curb box, set in a two-foot by two-foot concrete pad. Well risers were set below grade and fit with lockable J plugs. Detailed monitoring well construction diagrams are included in Appendix C.

2.3 Well Development

Following installation, both monitoring wells were developed to evacuate silts and other finegrained materials and to establish the filter pack to promote a hydraulic connection between the well and the surrounding aquifer. Well development was not initiated until at least 24 hours after well installation.

Monitoring well screens were developed using a combination of air lifting and manual surging, followed by pumping with a submersible pump. Turbidity was monitored during development to determine stabilization. In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells were developed until turbidity was less than 50 nephlometric turbidity units (NTUs) if possible. Table 3 summarizes total pumped volume from air lifting and pump development and final turbidity. Well development records are included in Appendix C.

2.4 Sampling

Following development, wells were allowed to stabilize for at least 2 weeks prior to groundwater sampling in accordance with low flow sampling procedures. Wells were purged using a bladder pump with a drop tube intake placed at the approximate midpoint of the screened interval (Table 2). The following water quality parameters were continuously measured: water temperature, pH, conductivity, oxidation-reduction potential, dissolved oxygen and turbidity. Groundwater analytical samples were collected when water quality parameters stabilized. Samples were analyzed for VOCs via method 8260C and 1,4 Dioxane via method 8270D SIM by Katahdin Analytical Services, Inc (Katahdin) a Department of Defense (DoD), Environmental Laboratory Accreditation Program (ELAP), and NYSDEC-certified laboratory. All development and purge water was managed as investigation derived waste (IDW). Analytical data is summarized in Table 4 and field parameters are listed in Table 5. Groundwater sample logs and data validation packages are included in Appendix C.

2.5 Decontamination and IDW

Resolution Consultants utilized dedicated and disposable sampling equipment when possible to avoid the potential for cross-contamination of samples. The sampling equipment included dedicated plastic scoops, disposable Teflon or polyethylene tubing, disposable gloves, and laboratory supplied sample bottles. Hand held equipment, and split spoons were decontaminated using Liquinox and water wash, a potable water rinse, followed by a distilled water rinse. Water was collected in 5-gallon pails or 55-gallon drums.

As part of the IDW management practices and in accordance with the SAP, the investigation waste (consisting of soil cuttings, drilling muds, IDW fluids, and personal protective equipment (PPE)) generated during the well installation was containerized and staged at NWIRP Bethpage. IDW solids were characterized and disposed of properly. Representative samples from each roll off were submitted to Katahdin for analysis of:

- Target Compound List (TCL) VOCs
- TCL Semi-volatile Organic Compounds (SVOCs)
- Toxicity Characteristic Leaching Procedure (TCLP) Metals
- Polychlorinated Biphenyls (PCBs)
- Total petroleum hydrocarbons (TPH)

- Total solids
- Corrosivity
- Ignitability
- Reactive Cyanide
- Reactive Sulfide
- Paint Filter

IDW water was containerized in frac tanks and stored at NWIRP Bethpage for characterization and ultimate disposal to the Publicly Owned Treatment Works (POTW), in accordance with the facilities existing discharge permit. A representative water sample was collected from each frac tank and submitted to Katahdin for analysis of VOCs via Method SW 624, pH via Method SW 9040B, PCBs via Method 8082 and Total Metals via Method SW 846 (all waters). To the extent feasible, soil and water were not mixed. All analytical criteria were met for disposal of soil and water.

2.6 Surveying

A survey of the boring locations was conducted at the end of fieldwork by C. T. Male, Inc., of Latham, NY, under the direct supervision of Resolution Consultants. The locations were tied into the existing base map developed for this investigation. The survey elevations are referenced to the North American Vertical Datum (NAVD) 1988 and have a vertical accuracy of 0.01 foot. Vertical control is based on observations of the Continuously Operating Reference (COR) Stations Queens and Central Islip. The horizontal location is referenced to the North American Datum (NAD) 1983 (2011) N.Y. Long Island Zone 3104 and has an accuracy of 0.1 foot. Local horizontal and vertical control is based on Global Positioning System (GPS) observations using the NYS Net Real Time Network.

A table of survey data (ground, latitude/longitude and northing/easting) and a survey map is included in Appendix C.

3.0 REFERENCES

Geraghty and Miller, Inc., 1994. *Remedial Investigation Report, Grumman Aerospace Corporation, Bethpage, New York*. Revised September.

Naval Facilities Engineering Command (NAVFAC), 2003. *Record of Decision Naval Weapons Industrial Reserve Plant Bethpage, New York, Operable Unit 2 – Groundwater*, NYS Registry: 1-30-003B. April.

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Resolution Consultants, 2014. Abbreviated Work plan –June 2014 Outpost Monitoring well Re installation (BPOW4-1R and BPOW4-2R) June.

Smolensky, D., and Feldman, S., 1990. *Geohydrology of the Bethpage-Hicksville-Levittown Area, Long Island, New York, U.S.* Geological Survey Water-Resourced Investigations Report 88-4135, 25 pp.

Tables

TABLE 1 BORING SUMMARY 2014 OU2 GROUNDWATER INVESTIGATION NWIRP BETHPAGE, NY

BORING	BORING START DATE	BORING COMPLETION DATE	GROUND ELEVATION (MSL)	TOTAL DEPTH (ft bgs)	SURFACE CASING SET AT (ft bgs)	NO. OF SPOON SAMPLES	GAMMA LOG (ft bgs)	NO. GW SAMPLES COLLECTED/ ATTEMPTED	TOC SAMPLES	DATE OF AIR SAMPLE
BPOW4-2R	9/25/2014	10/20/2014	66.60	784	53	18	775	none	673 - 675; 738 - 740	9/2/2014

TABLE 2 MONITORING WELL CONSTRUCTION SUMMARY 2014 OU2 GROUNDWATER INVESTIGATION NWIRP BETHPAGE, NY

MONITORING WELL	WELL COMPLETION DATE	GROUND ELEVATION (MSL)	WELL DEPTH (ft bgs)	CASING DEPTH (ft bgs)	SCREEN INTERVAL (ft bgs)	SUMP DEPTH INTERVAL (ft bgs)	BORING DEPTH (ft bgs)
BPOW4-1R	8/19/2014	64.08	697	53	652 - 692	692 - 697	707
BPOW4-2R	10/20/2014	66.60	770	53	725 - 765	765 - 770	784

TABLE 3 MONITORING WELL DEVELOPMENT SUMMARY 2014 GROUNDWATER INVESTIGATION NWIRP BETHPAGE, NY

MONTODAK	AIR DEVE	OPMENT	PUN	1P DEVELOPME	NT	APPROX. TOTAL	FINA L
MONITORING WELL	DATE	APPROX. VOLUME (GAL)	DATE	FINAL PUMP DEPTH (FT)	A PPROX. VOLUME (GA L)	DEVELOPMENT VOLUME (GAL)	TURBIDITY (NTUs)
BPOW4-1R	9/17/2014	6,500	9/18/2014- 9/19/2014	652-692	3,000	9,500	4.48
BPOW4-2R	10/21/2014	4025	10/22/14- 10/24/14	770	14,600	18,625	134

Location	Marie	BPOW4-1R	BPOW4-2R
Sample Date	NYSDEC Groundwater	12/30/2014	12/30/2014
Sample ID	Guidance or Standard Value (Note 1)	BP0W4-1R-GW-123014	BP0W4-2R-GW-123014
	, ,		

Sample ID	Standard Value (Note 1)	DF0VV4-1K-GVV-123014	DI 0114 ZIC 011 120014
Sample type code	(140te 1)	N	N
VOC 8260C (ug/L)			
1,1,1-TRICHLOROETHANE	5	< 0.50 U	< 0.50 U
1,1,2,2-TETRACHLOROETHANE	5	< 0.50 U	< 0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	8.0	11
1,1,2-TRICHLOROETHANE	1	< 0.50 U	< 0.50 U
1,1-DICHLOROETHANE	5	< 0.50 U	< 0.50 U
1,1-DICHLOROETHENE	5	< 0.50 U	< 0.50 U
1,2,4-TRICHLOROBENZENE	5	< 0.50 U	< 0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	< 0.75 U	< 0.75 U
1,2-DIBROMOETHANE	NL	< 0.50 U	< 0.50 U
1,2-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U
1,2-DICHLOROETHANE	5	< 0.50 U	< 0.50 U
1,2-DICHLOROETHENE, TOTAL	5	< 1.0 U	< 1.0 U
1,2-DICHLOROPROPANE	1	< 0.50 U	< 0.50 U
1,3-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U
1.4-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL NL	1.2	1.1
	50	< 2.5 U	< 2.5 U
2-BUTANONE			
2-HEXANONE	50 NI	< 2.5 U	< 2.5 U
4-METHYL-2-PENTANONE	NL 50	< 2.5 U	< 2.5 U
ACETONE	50	< 2.5 U	< 2.5 U
BENZENE	1	< 0.50 U	< 0.50 U
BROMODICHLOROMETHANE	50	< 0.50 U	< 0.50 U
BROMOFORM	50	< 0.50 U	< 0.50 U
BROMOMETHANE	5	< 1.0 U	< 1.0 U
CARBON DISULFIDE	60	< 0.50 U	< 0.50 U
CARBON TETRACHLORIDE	5	< 0.50 U	< 0.50 U
CHLOROBENZENE	5	< 0.50 U	< 0.50 U
CHLOROETHANE	5	< 1.0 U	< 1.0 U
CHLOROFORM	7	< 0.50 U	< 0.50 U
CHLOROMETHANE	5	< 1.0 U	< 1.0 U
CIS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U
CIS-1,3-DICHLOROPROPENE	0.4	< 0.50 U	< 0.50 U
CYCLOHEXANE	NL	< 0.50 U	< 0.50 U
DIBROMOCHLOROMETHANE	5	< 0.50 U	< 0.50 U
DICHLORODIFLUOROMETHANE	5	< 1.0 U	< 1.0 U
ETHYLBENZENE	5	< 0.50 U	< 0.50 U
ISOPROPYLBENZENE	5	< 0.50 U	< 0.50 U
M- AND P-XYLENE	NL	< 1.0 U	< 1.0 U
METHYL ACETATE	NL	< 0.75 U	< 0.75 U
METHYL CYCLOHEXANE	NL	< 0.50 U	< 0.50 U
METHYL TERT-BUTYL ETHER	10	< 0.50 U	< 0.50 U
METHYLENE CHLORIDE	5	< 2.5 U	< 2.5 U
O-XYLENE	NL	< 0.50 U	< 0.50 U
STYRENE	5	< 0.50 U	< 0.50 U
TETRACHLOROETHENE	5	< 0.50 U	< 0.50 U
TOLUENE	5	< 0.50 U	< 0.50 U
TRANS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	< 0.50 U	< 0.50 U
TRICHLOROETHENE	5	0.84 J	0.73 J
TRICHLOROFLUOROMETHANE	5	< 1.0 U	< 1.0 U
VINYL CHLORIDE	2	< 1.0 U	< 1.0 U
XYLENES, TOTAL	5	< 1.5 U	< 1.5 U
ATELINEO, TOTAL	L	\ \ 1.0 U	1.50

Notes:

1 New York State Department of Environmental Conservation Division of Water Technical and Operation Guidance series (6 NYCRR 700-706, Part 703.5 summarized in TOGS 1.1.1)

Ambient water quality standards and groundwater effluent limitations, class GA; NL = Not Listed

Bold = Detected; Bold and Italics = Not detected exceeds NYS Groundwater Standards or guidance value

Yellow highlighted values exceed Groundwater Standards or guidance value

Sample type codes: N - normal environmental sample, FD - field duplicate

U = Nondetected result. The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte.

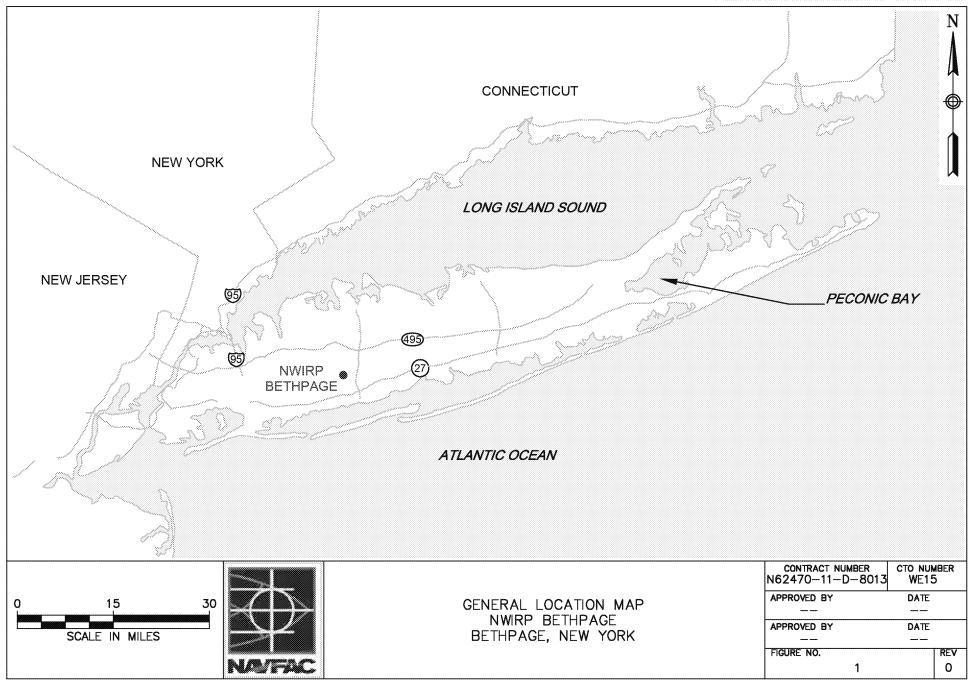
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

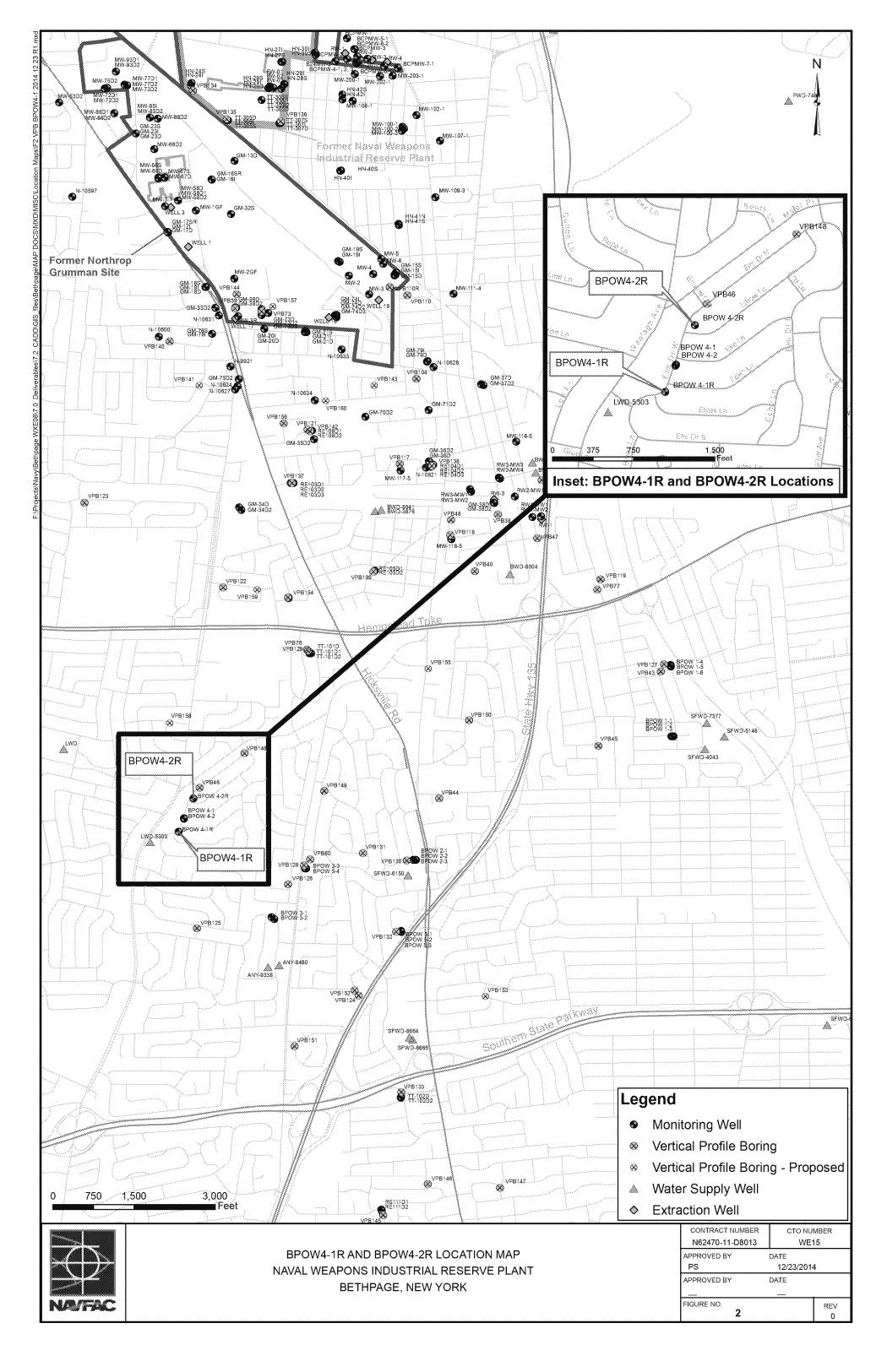
M = the matrix spike or matrix spike duplicate did not meet recovery or precision requirements.

Well	Date Te	Temperature pH		Specific Conductance (μS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Depth to water (ft bgs)	Flow rate (ml/min)
BPOW4-1R	12/30/2014	12.55	5.54	0.037	4.21	255.7	2.4	22.11	585
BPOW4-2R	12/30/2014	12.42	5	0.035	4.62	241.6	66.3	23.34	400

^{*} Initial water level not equilibrated due to pump installation; drawdown during sampling not determined.

Figures





Appendix A
BPOW4-1, BPOW4-2 Logs

Section 1

Boring and Gamma Logs

Page ___ of ______

		NAME			Bethpag	<u>je</u>	BORING No.: BPOW4-1							
PRO.	JECT	NUME		N4037			entrantestara (1886)	DATE:		7-8-03 Conti / Shick.			idinan <u>ana</u>	
		RIG:		Uni-Te			condicionado	DRILLER:	, , .		<u> </u>	*************		10000000
חות	LING	nia.		PAIL	<u> </u>		RIAL DESCRIPT		00000000000	J BLEMINGS	34 PS APPA) Resc		
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		NAME		NWIRP N4037	Bethpag	<u>je</u>				DAT		ю.:	7-15-03			************	
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Con	verte	d to We	ell:	Yes	V		No	WATERCONSTRUCTION			Well I.	D. #:	BP0W4-1				

Page 8 of 14

PROJECT NAME: BORING No.: BPOW 4-1 **NWIRP Bethpage** PROJECT NUMBER: N4037 DATE: 7-15-03 GEOLOGIST: Centi ShickorA DRILLING COMPANY: Uni-Tech J. Blenings failing **DRILLER: DRILLING RIG:** 1500 MATERIAL DESCRIPTION PID/FID Reading (ppm) Lithology Depth Blows / Sample U 6" or ROD Recovery Change (FL) No. and S (Depth/Ft.) Soil Density/ Sampler BZ Туре о or (%) 1 Oriller BZ** С Consistency ROD Sample Remarks Run Qξ Color **Material Classification** S Screened No. Length Of Rock Interval Herdness 350 360 Sand (Trace S. 1+/c/al) From cuttings 0 1423 370 380 1455 390 Same às above From cuttings 0

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When rock coring, enter rock * Include monitor reading in 6 Remarks:		Drilling Area Background (ppm):	0			
Converted to Well:	Yes	V	No	Well I.D. #:	BP0W 4-1	

Page 9_ of 14

PRO	JECT	NAME NUME COME	BER:	N4037 Uni-Ted	Bethpaç :h	<u></u>		DATE:		7-15-03 Conti Shickora						
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Conv	verted	to We	ell:	Yes		*	No	Well I.	D. #:	BPOW 4-1						

PRO.	JECT	NAME NUME COMF	BER:	NWIRP N4037 Uni-Tec	Bethpaç ch	<u>je</u>	n	ATF.	•	BPOW 4-1 7-15-03 Centir Shickora					
		RIG:		Fail		<u>်ဝဝ</u>	D	RILLER:		J. Blemin	٧_				
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_		to We		Yes			No	Walling		BP0W4-1				_	



		NAME NUME		N4037	Betnpag	<u> </u>		•	DATE:	NO	7-16-03				-		
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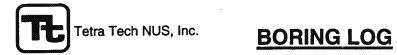
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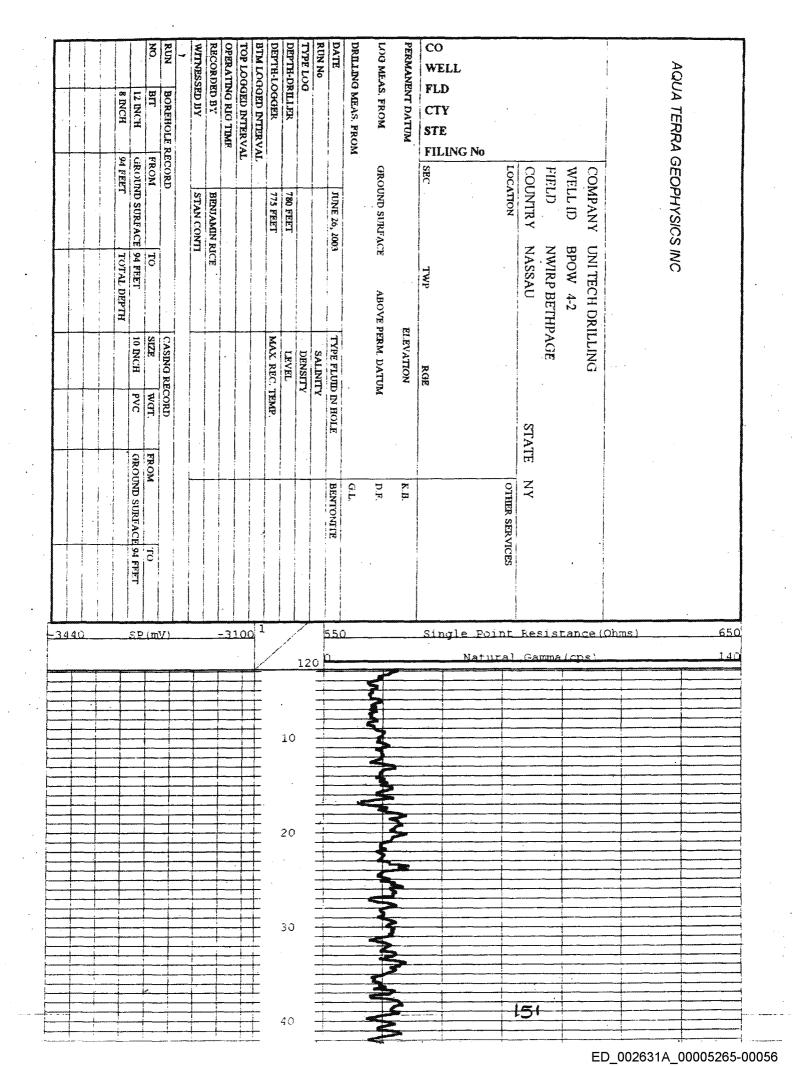
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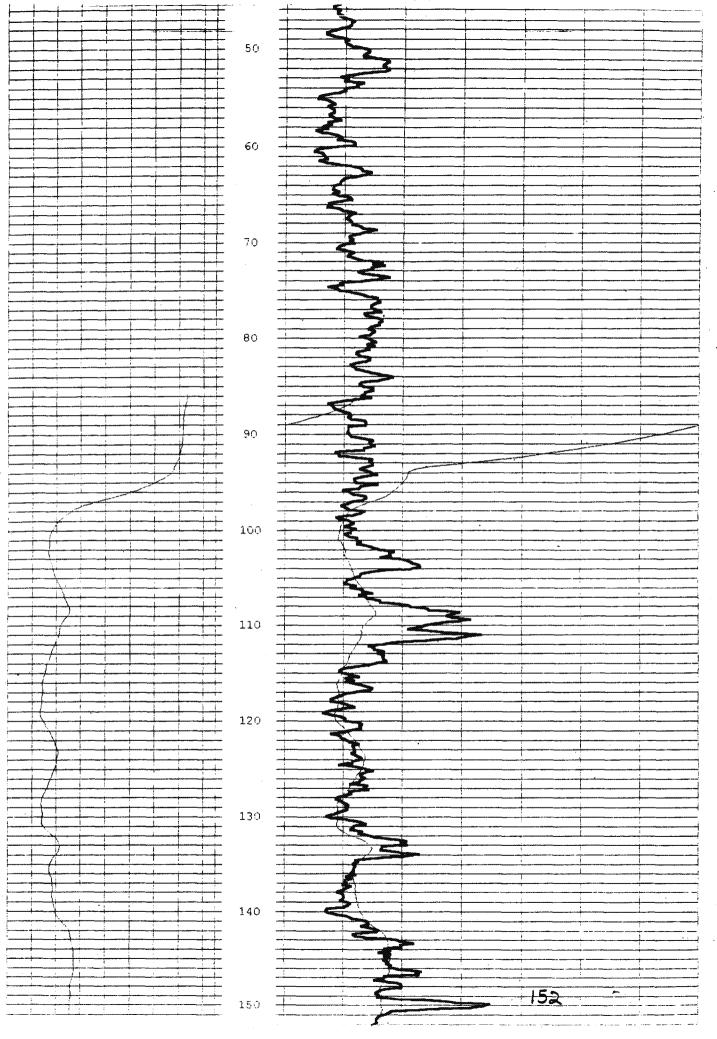


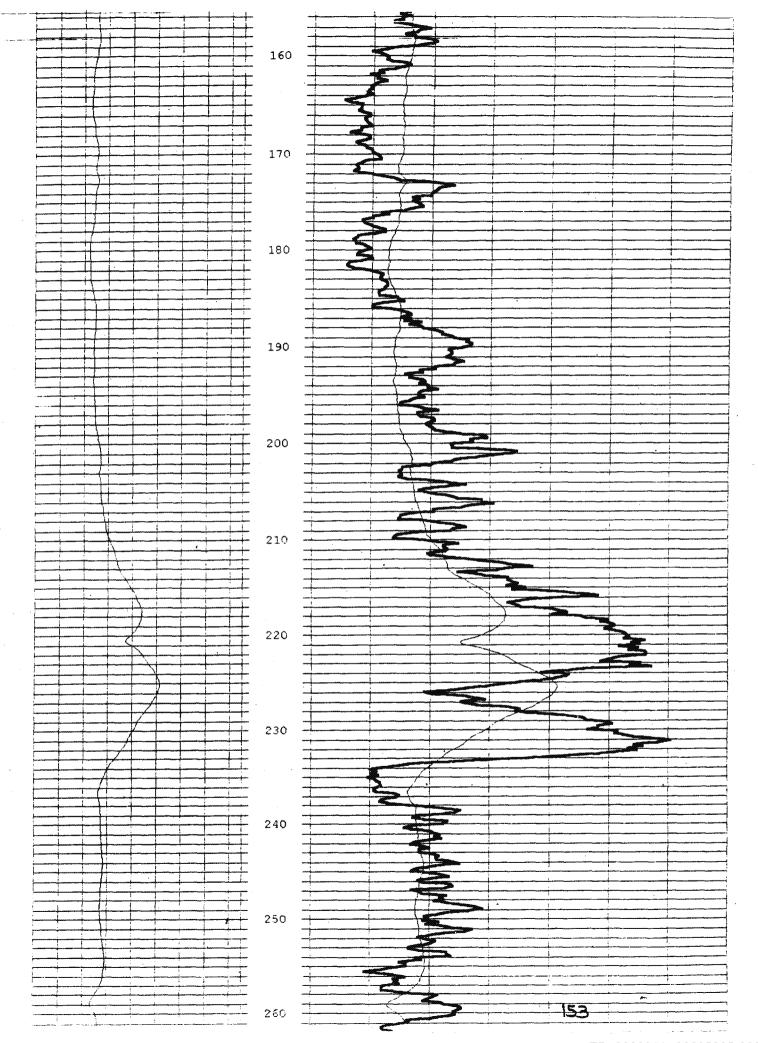
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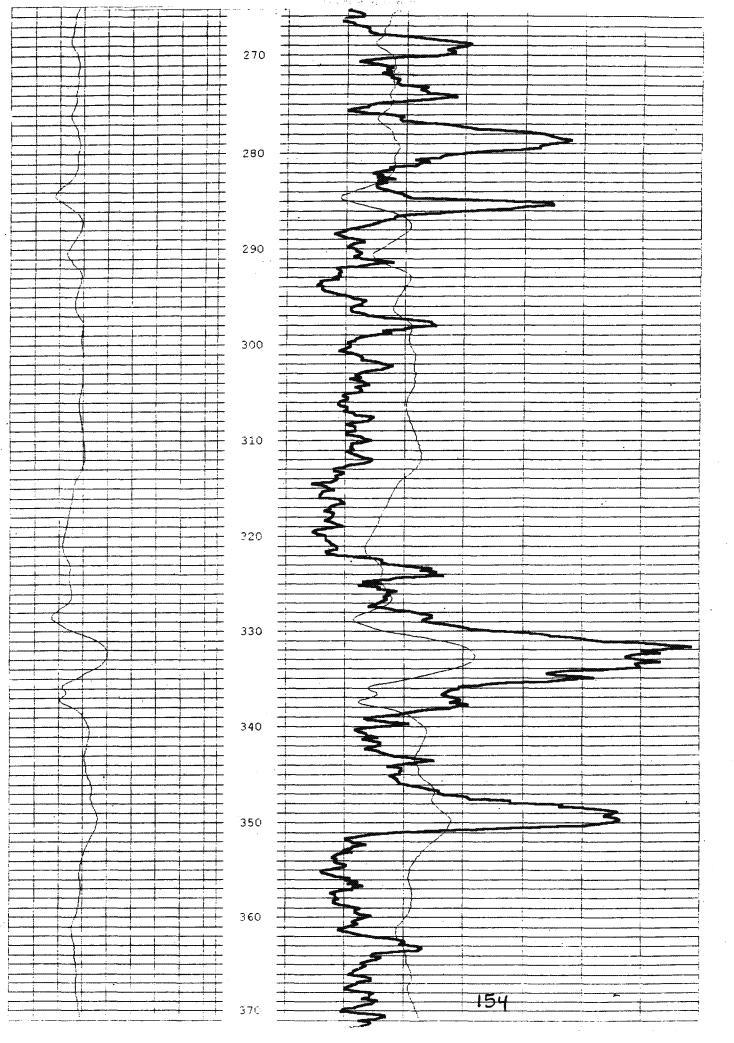


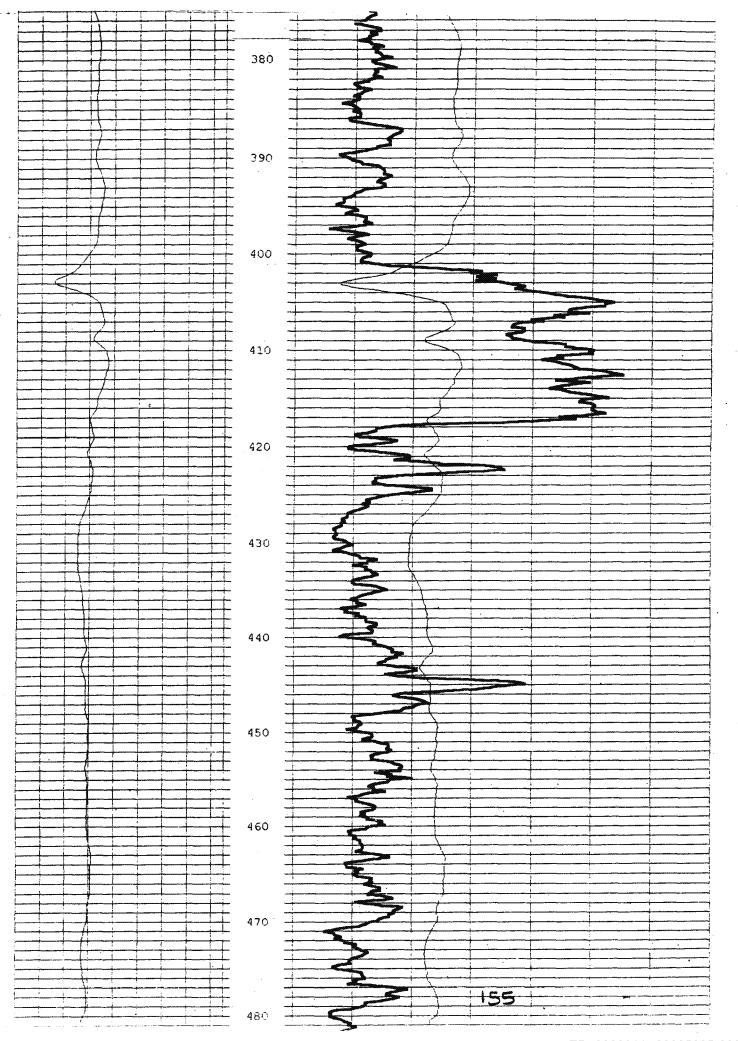
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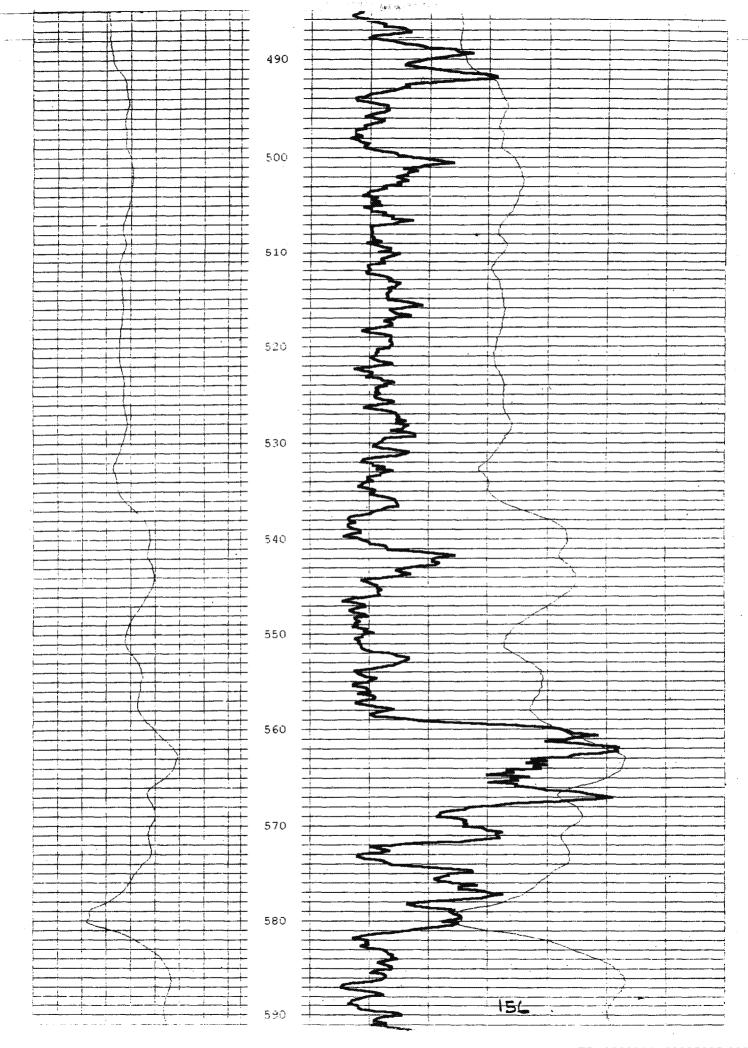


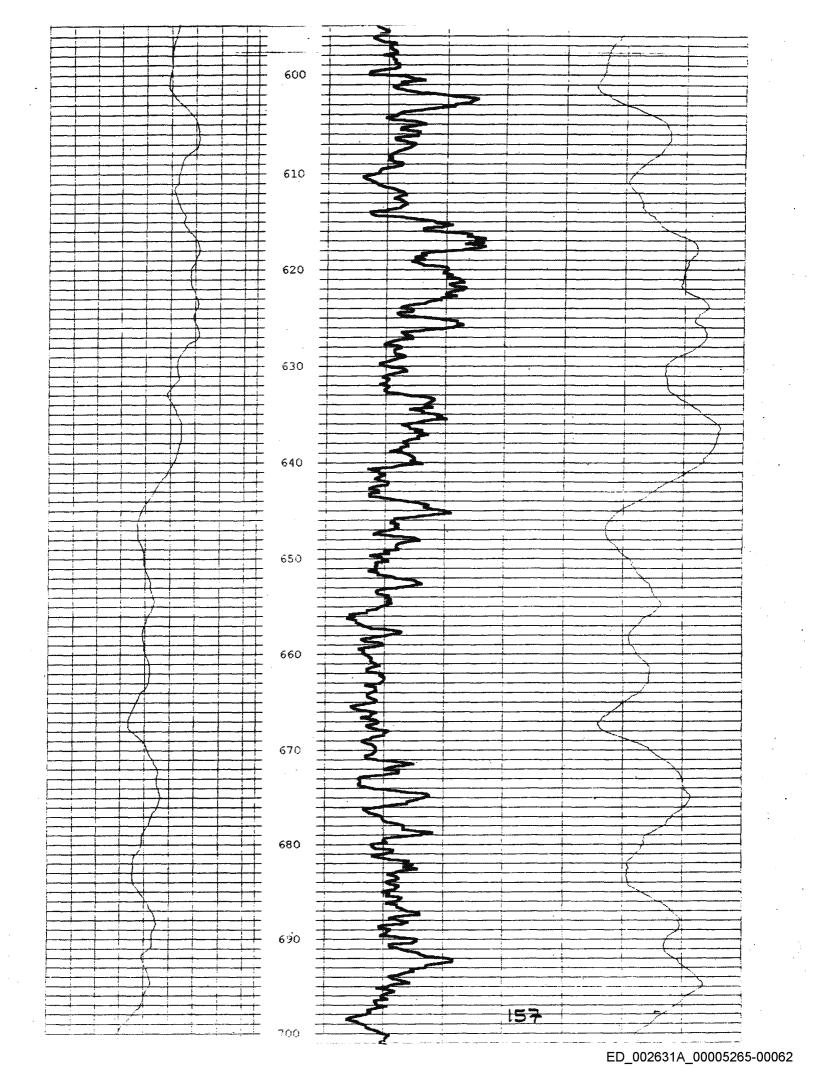


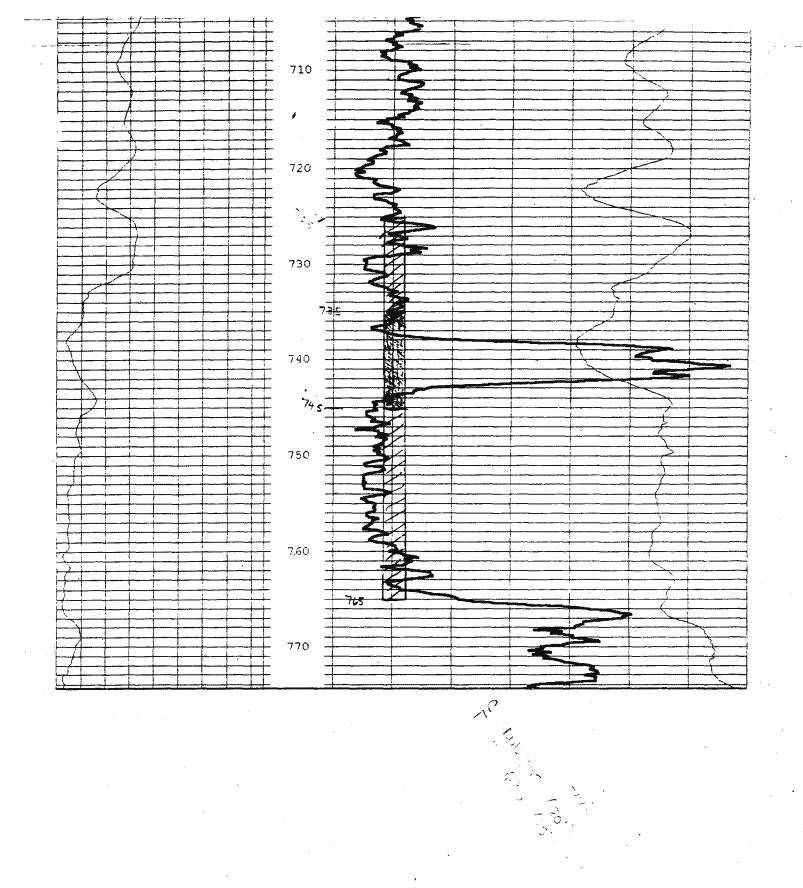












# Section 2 Monitoring Well Construction Log



BPOW4-1 WELL No .:

MONITORING WELL SHEET **PERMIT No:** Brows - 1 **BORING No.:** DRILLING Co.: UNITECH PROJECT: NWIRP DATE COMPLETED: DRILLER: 7117103 BLEMMINGS N4037 PROJECT No.: →1219103 MUD ROT NORTHING: **DRILLING METHOD:** BETHPAGE SITE: **DEV. METHOD:** AIR/PUMP **EASTING:** CONTI **GEOLOGIST:** Elevation / Depth of Top of Riser: Elevation / Height of Top of Surface Casing: I.D. of Surface Casing: STEEL Type of Surface Casing: Ground Elevation Datum: CONCRETE Type of Surface Seal: PAD 2'X2'XC" 10" CAS I.D. of Riser: To 85 PUC SCH 80 Type of Riser: 834 ~ 9" 85 Borehole Diameter. YAJJOU Type of Backfill: Elevation / Depth of Seal: FSAUD#O (BO) 1 AU Type of Seal: 1620 K-PACKER Elevation / Depth of Top of Filter-Pack: 642 C. SAND 1652 Elevation / Depth of Top of Screen: 10 SLOT 2" STAINLESS Type of Screen: PUC SCH 80 STEEL SCREEN 10 SL ×40' Slot Size x Length: INSTALLED INITIAL 12/9/03 13/16 AS PARTOF I.D. of Screen: RECONSTRUCTION OF WELL. Type of Filter Pack: 1692 Elevation / Depth of Bottom of Screen: NOTE: Elevation / Depth of Bottom of 1693 10' S.S RISER Filter Pack: PLACED ABOVE Type of Backfill Below Well: SCREEN -SILICA SAND 652 -642

Not to Scale

Elevation / Total Depth of Borehole:

700



#### WELL No.:

BPOW 4-2

MONITORING WELL SHEET

PERMIT No:

PROJECT:	NWIRP	DRILLING Co.:	UNITECH	BORING No.:	BP0W4-2
PROJECT No.	N4037	DRILLER:	BLEMINGS	DATE COMPLETED	: <u>7/7/03</u>
SITE:	BETHPAGE	DRILLING METHO	DD: MUD ROT	NORTHING:	
GEOLOGIST:	CONTI	DEV. METHOD:	AIR/PUMP	EASTING:	
	Γ		Elevation / Depth of Top	of Riser:	1
			Elevation / Height of Top Surfa	of ace Casing:	/
			I.D. of Surface Casing:	9"	·
Ground Elevation	n Datum:		Type of Surface Casing:	STEEL	
			Type of Surface Seal:  PAD 2' × 2' ×	CONCRETE	
CA	PVC		I.D. of Riser:	313/16"	
10	) ' · · · · · · · · · · · · · · · · · ·		Type of Riser:	PVC SCH 80	
	100'		Borehole Diameter:	91/2"	
			Type of Backfill:	VOLCLAY GROUT	
			Elevation / Depth <del>of Seal</del>	F SAND#O	1 690
	•	•	Type of Seal:	NA_	
		-	Elevation / Depth of Top	C SAND -	/705
	<b>-</b>	-	Elevation / Depth of Top	of Screen:	/725
			Type of Screen:	PVC SCH	08
	-		Slot Size x Length:	10 × 30 W	10' BLANK 735 →745
	-		I.D. of Screen:	3 13/16"	
			Type of Filter Pack:	SILICA SAND	
			Elevation / Depth of Botto	om of Screen:	1765
			Elevation / Depth of Botto	om of Filter Pack:	1766
			Type of Backfill Below W	/ell:	
	Not to	Scale	Elevation / Total Depth o	of Borehole:	1780

Appendix B
BPOW4-1, BPOW4-2
Integrity Testing
Rehabilitation
Decommissioning

Section 1

BPOW4-1, BPOW4-2

Integrity Testing

Revision No: 0 Revision Date: 06/03/2014



**To:** Lora Fly, DON, NAVFAC MIDLANT

**From:** Brian Caldwell, P.G., Resolution Consultants

Subject: NWIRP Bethpage Well Integrity Test Summary

Date: 4 October 2013

The following is a summary of the well integrity testing performed at the Naval Weapons Industrial Reserve Plant (NWIRP) located in Bethpage, New York. Resolution Consultants (ResCon) and Delta Well and Pump of Ronkonkoma, New York (Delta) conducted well integrity testing activities on July 22, 2013, and September 12-13, 2013. Well integrity testing was performed on off-site wells BPOW4-1 and BPOW4-2. The purpose of the well integrity testing was to assess well performance, determine if well packers are functioning properly, determine if cracks exist in the well casings, and complete any necessary repairs.

On July 22, 2013 ResCon and Delta tested BPOW4-1 and BPOW4-2. Delta utilized a portable nitrogen tank and regulator to inflate the packers in BPOW4-1 and BPOW4-2 to approximately

Revision No: 0 Revision Date: 06/03/2014

210 psi. ResCon utilized an EIP to gauge the static water level within each well casing and measure drawdown. Depth to static water in BPOW4-1 was 26.38 ft and depth to static water in BPOW4-2 was 26.08 ft.

Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-1 to pump the well for approximately 70 minutes at approximately 4.5 gpm. No drawdown was observed. The final turbidity was 4.2 NTU. Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-2 to pump the well for approximately 70 minutes at approximately 5 gpm. Final turbidity was 12.2 NTU. Drawdown was approximately 0.03 ft. Both wells were determined to be functioning properly and no additional well development is necessary.

On September 12, 2013 ResCon and Delta re-tested BPOW4-2 because of a concern that there could still be a crack in the casing above the packer assembly. ResCon utilized an EIP to gauge the static water level within the well casing and measure drawdown. Depth to static water in BPOW4-2 was 26.74 ft.

Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-2 to pump the well for approximately 20 minutes at approximately 7 gpm. Drawdown within the well was approximately 13.22 ft. Based on a flow rate of 7 gpm, the specific capacity of BPOW4-2 was calculated to be 0.53 gpm/ft.

Once the water level returned to static, Delta utilized a portable nitrogen tank and regulator to inflate the packer in BPOW4-2 to approximately 300 psi. Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-2 to pump the well for approximately 20 minutes at approximately 7 gpm. The water level in the casing rose from 26.30 ft to 26.00 feet during the 20 minute pump test. Approximately 300 total gallons were pumped from BPOW4-2 and final turbidity was 9.1 NTU.

Upon completion of the pump tests and a return to static water level, ResCon performed a static water test. The packer was inflated to approximately 300 psi and ResCon added 5 gallons of distilled water to the well. Initial depth to water was 17.80 ft. The water level within the well was gauged for 40 minutes. The water level within BPOW4-2 dropped from 17.80 ft to 25.31 ft during the 40 minute test.

Revision No: 0 Revision Date: 06/03/2014

On September 13, 2013 ResCon and Delta re-tested BPOW4-1. ResCon utilized an EIP to gauge the static water level within the well casing and measure drawdown. Depth to static water in BPOW4-1 was 26.21 ft.

Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-1 to pump the well for approximately 20 minutes at approximately 6 gpm. Drawdown within the well was approximately 2.16 ft. Based on a flow rate of 6 gpm, the specific capacity of BPOW4-1 was calculated to be 2.78 gpm/ft.

Once the water level returned to static, Delta utilized a portable nitrogen tank and regulator to inflate the packer in BPOW4-1 to approximately 265 psi. Delta utilized the dedicated submersible pump, set below the packer, in BPOW4-1 to pump the well for approximately 20 minutes at approximately 6 gpm. The water level in the casing rose from 26.14 ft to 25.97 ft during the 20 minute pump test. Approximately 225 total gallons were pumped from BPOW4-1 and final turbidity was 7.4 NTU.

Upon completion of the pump tests and a return to static water level, ResCon performed a static water test. The packer was inflated to approximately 265 psi and ResCon added 5 gallons of distilled water to the well. Initial depth to water was 17.70 ft. The water level within the well was gauged for 60 minutes. The water level within BPOW4-1 dropped from 17.70 ft to 24.38 ft during the 60 minute test.

Based on the results of the well integrity testing, BPOW4-1 and BPOW4-2 seem to be losing water from above the packer. Due to the loss of water from water from above the packer, it is recommended that BPO W4-1 and BPOW4-2 be resleeved with 2-inch diameter PVC well screen and well casing.

Section 2

BPOW4-1, BPOW4-2

Rehabilitation

Abbreviated Work Plan BPOW4-1R and 4-2R NWIRP Bethpage, NY Revision No: 0 Revision Date: 06/03/2014



To: Lora Fly, DON, NAVFAC MIDLANT

From: Brian Caldwell, P.G., Resolution Consultants

Subject: 2014 Rehabilitation of BPOW4-1 and BPOW4-2 (OU2), NWIRP

**Bethpage** 

**Date:** 28 April 2014

Starting on February 12, 2014 Resolution Consultants (ResCon), and subcontractor Delta Well and Pump Co., Inc. (Delta), was on-site at outpost well locations BPOW4-1 and BPOW4-2 to begin rehabilitation activities on both wells. These wells were constructed of 4-inch Schedule 80 PVC and the rehabilitation would include the installation of a 2" Schedule 80 PVC well within each existing casing. Work was conducted over a period of 10 days.

Initially, records indicated BPOW4-2 was a total depth of 765' below ground surface (bgs), while field gauging indicated it was a total depth of 755' bgs. Attempts using a steel bailer and air lifting to try and remove sediment from the bottom of the well were both unsuccessful. It was determined to set a 2" Schedule 80 PVC well using the field determined depth of 755' bgs. A 40' section of 0.010 slot screen with 715' of riser was placed in the well. The primary and secondary filter packs were installed to a depth of 672' bgs. A high-yield bentonite grout mixture was then installed. Over a period of 5 days, more than 100 gallons of the bentonite grout mixture was added to the well with the level of the grout only rising to approximately 668' bgs. This loss of grout indicated a possible crack in the original casing where grout was escaping; therefore, efforts to rehabilitate BPOW4-2 were abandoned.

Revision No: 0 Revision Date: 06/03/2014

Records indicated that well BPOW4-1 was a total depth of 692' bgs. Also, there was a 50' section of 2" stainless steel screen and riser with a k-packer stuck in the bottom of the well. This packer setup needed to be removed in order to set the new well within the 4" casing. Four retrieval attempts were made using two different retrieval tools over a period of 4 days. The packer setup was finally retrieved on February 26, 2014. Following retrieval, depth to bottom of the well was gauged to be 663' bgs, which was 29' shallower than the expected 692' bgs. It was determined that the well possibly collapsed following removal of the packer setup, therefore efforts to rehabilitate BPOW4-1 were also abandoned.

Section 3

BPOW4-1, BPOW4-2

Decommissioning



**To:** Lora Fly, DON, NAVFAC MIDLANT

From: Brian Caldwell, P.G., Resolution Consultants

Subject: Well Decommissioning for BPOW4-1 and BPOW4-2

**Date:** 30 April 2014

Arcadis performed groundwater sampling at outpost monitoring wells BPOW4-1 and BPOW4-2 in May 2013. Analytical results found concentrations of trichlorotrifluoromethane (Freon 113) above the trigger value. Well integrity testing was performed on both monitoring wells in September 2013 following the procedures outlined in the UFP Sampling and Analysis Plan (SAP) Addendum (August 2013). The testing found both wells were compromised.

Resolution Consultants implemented the Outpost Monitoring Well Rehabilitation Work Plan (Revision date 11/27/13) in February 2014. The objective of the work was to install new 2-inch monitoring wells inside the existing 4-inch monitoring wells. Numerous attempts were made to install the new wells. However, Delta was unable re-sleeve either well.

#### **Well Decommissioning Proposal:**

Resolution Consultants proposes to decommission these two wells in conformance with CP-43: Groundwater Monitoring Well Decommissioning Policy (NYSDEC, November 3, 2009).

The selected method for decommissioning will be grouting in place. The grout mix will follow the guidance in CP-43, Section 6.1. A tremie pipe will be lowered into the well

casing. Grout will be pumped into the well until visible at the ground surface. All groundwater displaced during grouting will be collected and properly disposed as drilling fluids. The grout level will be monitored for settling over several days. Grout will be added to the casings as needed until the level is approximately five feet below grade. Once the grout has hardened, the casings will be cut approximately five feet below grade. A ferrous marker will be embedded in the top of the grout to indicate the location of the former monitoring well. A fabric "utility" marking will be placed one foot above the grout so any future excavation will be alerted to the former monitoring well. The open hole will be backfilled with material similar to the surrounding soils. The site will be restored to match the surrounding conditions in accordance with the Sampling and Analysis Plan.

# Appendix C BPOW4-1R, BPOW4-2R Installation

Section 1

Boring and Gamma Logs

# **Boring Log**

BORING #: BPOW4-1R Sheet 1 of 2

Client: Department of the Navy, Naval Facilit	Logged By: G. Hicks	
Location: Elm Dr. W. and Eden Ln. Levittown	Drilling Company: DELTA WELL AND PUMP COMPANY	
Project #: 60266526	Ground Elevation (msl): 64.08	Well Screen Interval (ft): 652-692
Start Date: 8/8/2014	Drilling Method: Auger (0-50' bgs) Mud Rotary (>50' bgs)	Water Level (ft):
Finish Date: 8/19/2014	Northing: 200281.258 Easting: 1123067.502	Total Depth (ft): 707.0

<b>ДЕРТН</b> (ft)	PID (ppm)	Formation	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION	Well	Completion	Well Construction
0		***************************************			653 - 695 ft bgs: see BPOW4-2R for Descriptions			10" Diameter Steel Casing
50								Casing
100								
150								
200							*	4" Diameter Schedule 80 PVC Riser
250								
300								
350								
400								
450							4	Bentonite Grout
								Bollonic Groat
500								
550								

# **Boring Log**

BORING #: BPOW4-1R Sheet 2 of 2

Client: Department of the Navy, Naval Facilit	Logged By: G. Hicks	
Location: Elm Dr. W. and Eden Ln. Levittown	Drilling Company: DELTA WELL AND PUMP COMPANY	
Project #: 60266526	Ground Elevation (msl): 64.08	Well Screen Interval (ft): 652-692
Start Date: 8/8/2014	Drilling Method: Auger (0-50' bgs) Mud Rotary (>50' bgs)	Water Level (ft):
Finish Date: 8/19/2014	Northing: 200281.258 Easting: 1123067.502	Total Depth (ft): 707.0

	(î	uc		<u> </u>		no	
DEPTH (ft)	PID (ppm)	Formation	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION	Well	Well Construction
600 602 604 606	***************************************	••••••••••			653 - 695 ft bgs: see BPOW4-2R for Descriptions (continued)		Bentonite Grout (continued)
608 610 612 614 616 618							#0 Filter Sand
620 622 624 626 628 630 632							
634 636 638 640 642							#1 Filter Sand
646 648 650 652 654							
658 660 662 664 666							
670 672 674 676 678							4" Diameter schedule 80 PVC, 10 Slot Well Screen (652-692 ft bgs)
680 682 684 686 688 690							
692 694 696 698							Tail Pipe (692-697 ft bgs)
700 702 704 706							#1 Sand to bottom of boring

End of boring at 707.0 ft. bgs.

## **Boring Log**

BORING #: BPOW4-2R

<b>Consultants</b>	Sheet 1 of 2	
Client: Department of the Navy, Naval	Logged By: P. Kareth	
Location: Elm Dr. W. and Elbow Ln. Lev	ttown, NY	Drilling Company: DELTA WELL AND PUMP COMPANY
Project #: 60266526	Ground Elevation (msl): 66.6	Well Screen Interval (ft): 725-765
Start Date: 10/13/2014	Drilling Method: Auger (0-50' bgs) Mud Rotary (>50' bgs)	Water Level (ft):
Finish Date: 10/20/2014	Northing: 200691.906 Easting: 1123200.043	Total Depth (ft): 784.0
(ft) (ppm) ation	의 기계 의 기계 의 기계 의 기계 의 기계 의 기계 의 기계 의 기계	le le le le le le le le le le le le le l

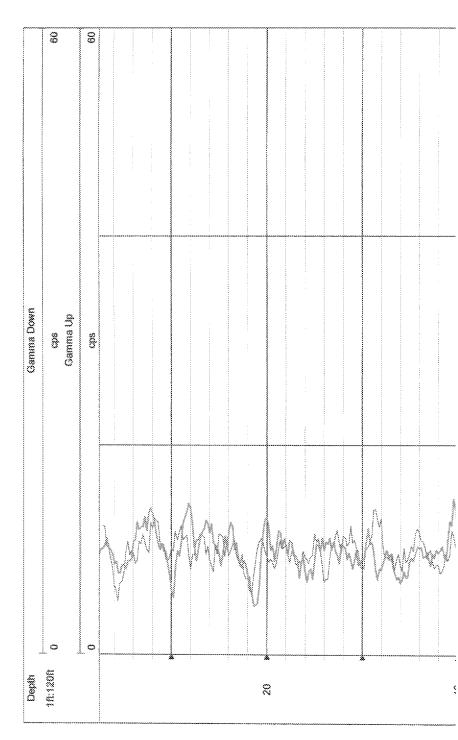
# **Boring Log**

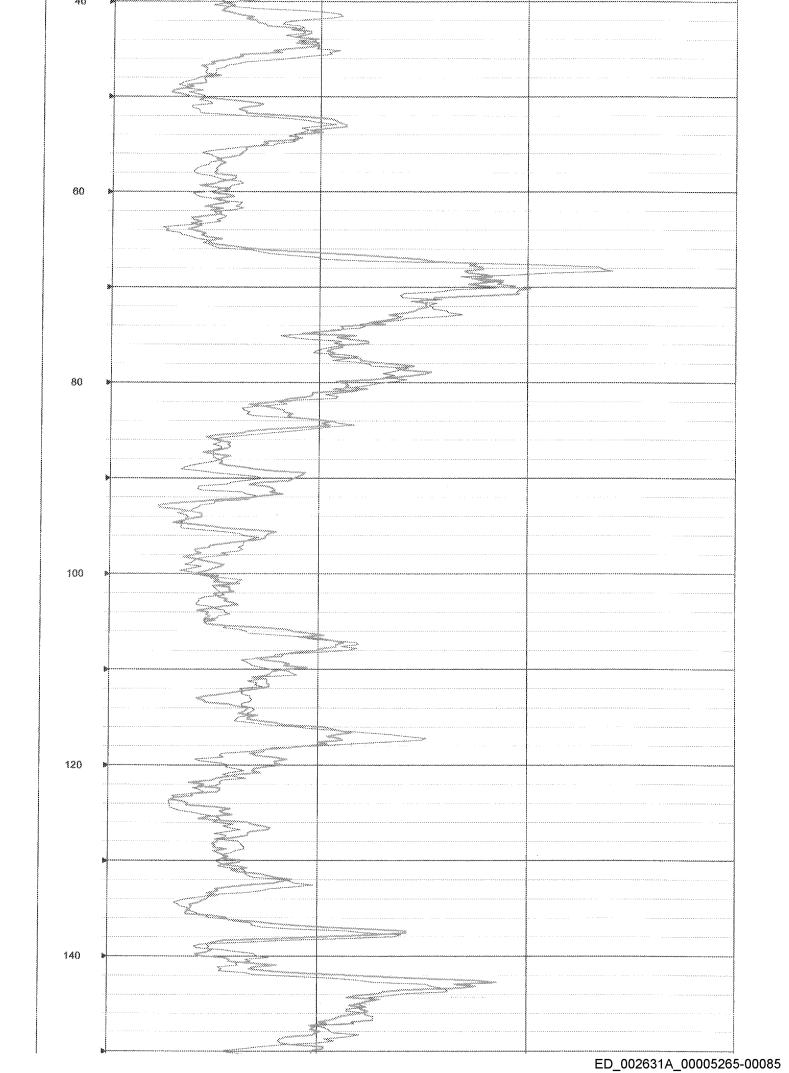
BORING #: BPOW4-2R Sheet 2 of 2

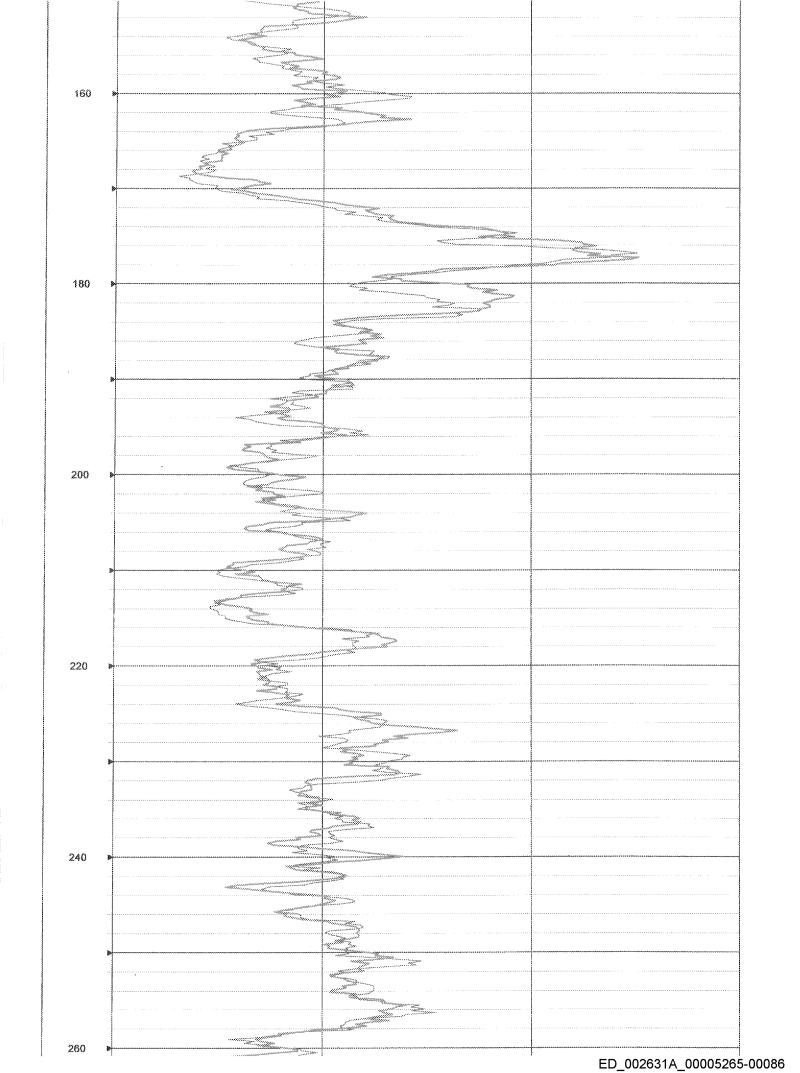
Client: Department of the Navy, Naval Facilit	Logged By: P. Kareth	
Location: Elm Dr. W. and Elbow Ln. Levittowr	Drilling Company: DELTA WELL AND PUMP COMPANY	
Project #: 60266526	Ground Elevation (msl): 66.6	Well Screen Interval (ft): 725-765
Start Date: 10/13/2014	Drilling Method: Auger (0-50' bgs) Mud Rotary (>50' bgs)	Water Level (ft):
Finish Date: 10/20/2014	Northing: 200691.906 Easting: 1123200.043	Total Depth (ft): 784.0

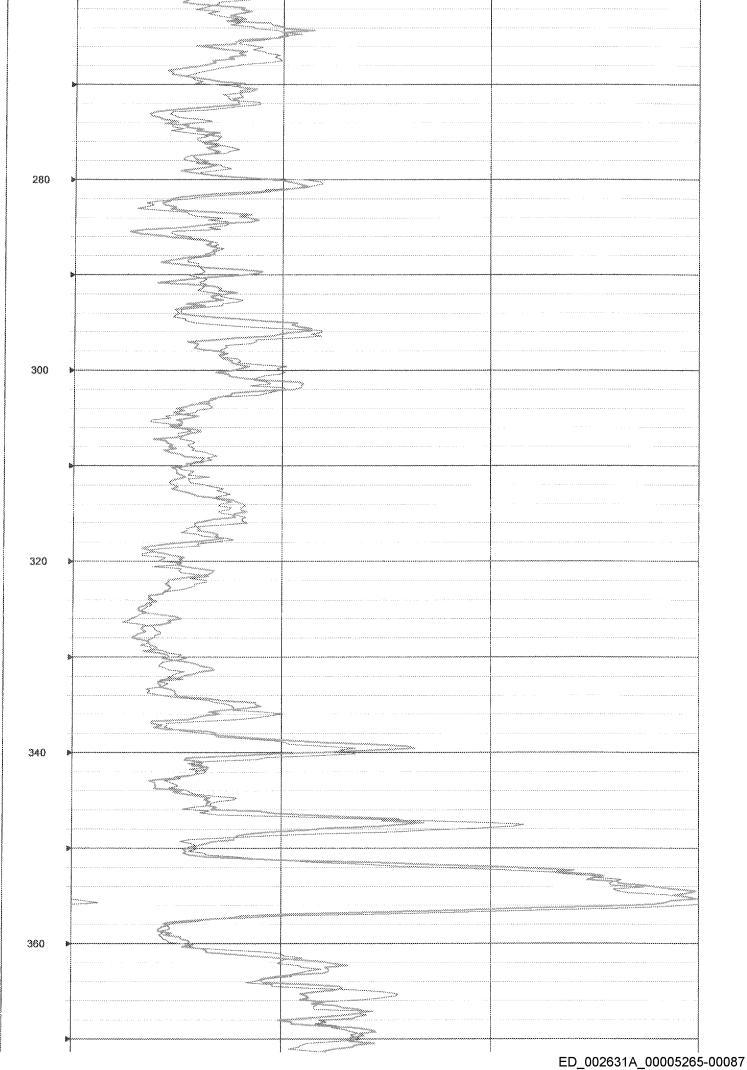
DEPTH (ft)	PID (ppm)	Formation	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION	Well	Well Construction
650 652 654 656 6658 660 662 664 666 668 667 670 672 674 676 678 680 682 684 688 689 690 692 694 698 700 706 708 710 711 711 711 711 711 711 711 711 711	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Forms	SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM SP/SM	GRAF	Gray (10 YR 2/1) fine SAND, trace Silt, brown mottling  Gray (10 YR 7/1) fine SAND, trace Silt, trace coarse sand to fine gravel  Gray (10 YR 7/1) medium to fine SAND, trace Silt, some brown mottling  Gray (10 YR 6/1) clayey coarse to fine SAND, brown mottling  Gray (10 YR 7/3) silty medium to fine SAND, brown mottling, Clay nodule  Reddish brown (7.5 YR 6/6) silty coarse to fine SAND, some gray mottling  Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, yellow mottling  Yellowish gray (10 YR 8/1) medium to fine SAND, trace Silt  Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace coarse sand to fine gravel  Yellowish gray (10 YR 7/3) silty coarse to fine SAND, some Clay, trace fine gravel  Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt  Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt  Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt  Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt  Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt  Yellowish gray (10 YR 7/1) coarse to fine SAND, trace Silt, trace fine gravel  Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace fine gravel  Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace fine gravel  Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace fine gravel  Yellowish gray (10 YR 7/1) medium to fine SAND, trace Silt, trace fine gravel	Compi	#0 Filter Sand  #1 Filter Sand  #2 Diameter schedule 80 PVC, 10 Slot Well Screen (725-765 ft bgs)
770 772 774 776 778 780			SP/SM				bgs) #1 Sand to bottom of boring

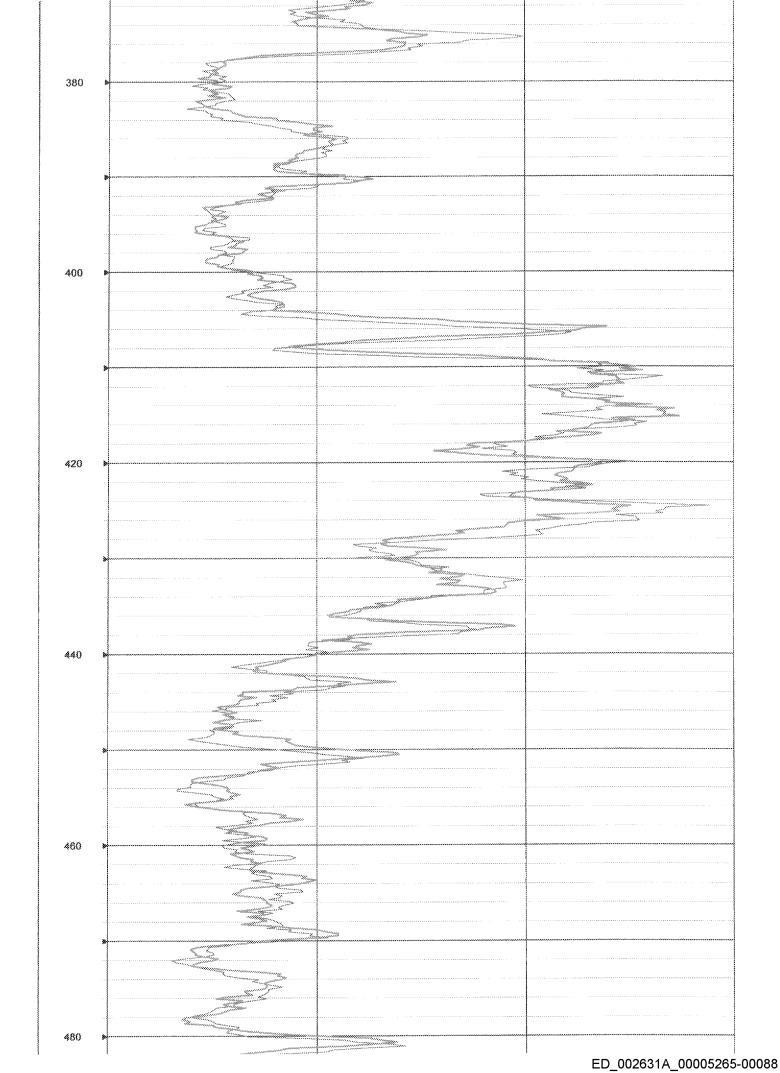
ĄQĮ	JA	TE	RR	lA (	GEO	PHYSICS	SINC					
					CO	MPANY :	DELTA WELL	& PUMP				
					WE	LL ID	BPOW4 - 2R					
					FIE	LD :	NWIRP BETH	PAGE				
					COL	JNTRY	LEVITTOWN		STA	TE	NEW YOR	K
				60	}	ATION PSITE # 37 EI	.M DR. W.				OTHER SERV	TCES
2 2	<u> </u>	~	122 120 120	FILING No	SEC	C TWP RGE						
PERMAN	PERMANENT DATUM ELEVATION K.B.											
LOG ME/ DRILLIN						UND SURFA	CE ABOVEI	PERM. DATU	M		D.F.	
DATE						OCTOBER 1	8 2014	TYPE FLUI	DRIBOLE		BENTONITE	
RUN No						001033343	.0, 2027	SALINIT		~~~~~	DENTI OTTERS	
TYPE LO	G					NATURAL (	JAMMA	DENSIT	<u> </u>	••••••		
DEPTH-D	RIL	LE	₹			785 FEET	***************************************	LEVEL		*************		
DEPTH-L	OG:	GER				778 FEET		MAX, REC. TEMP.		······································		
BTM LO	KE	DP	VIER	RVA	L							
TOP LOG							····					
OPERATI			TIM	Œ								
RECORD						BENJAMIN						
WITNESSED BY PAUL KARETH							~~~~					
RUN	Tac	15 E.	un i	gpt	CORD	······		La Valentia Da	20000			
NO.	Br		. 52-52-5		ROM	*	TO	CASING RE	WGT.	EBOX		TO
	<del>,</del>		ICH	j	2 FEE	ľ	<del></del>	10 INCH				
	T			7		·		3 INCH	DRILL PIPE			775 FEET
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			************									
***************************************					000000000000000000000000000000000000000	00000000000000000000000000000000000000						

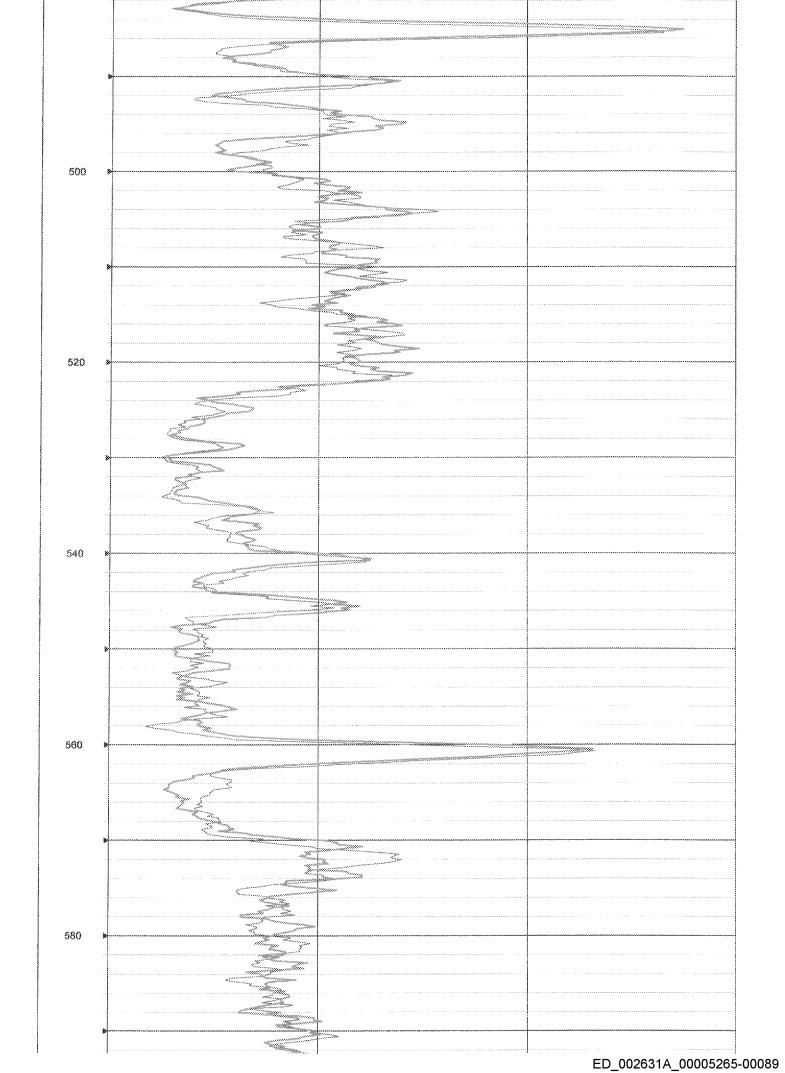


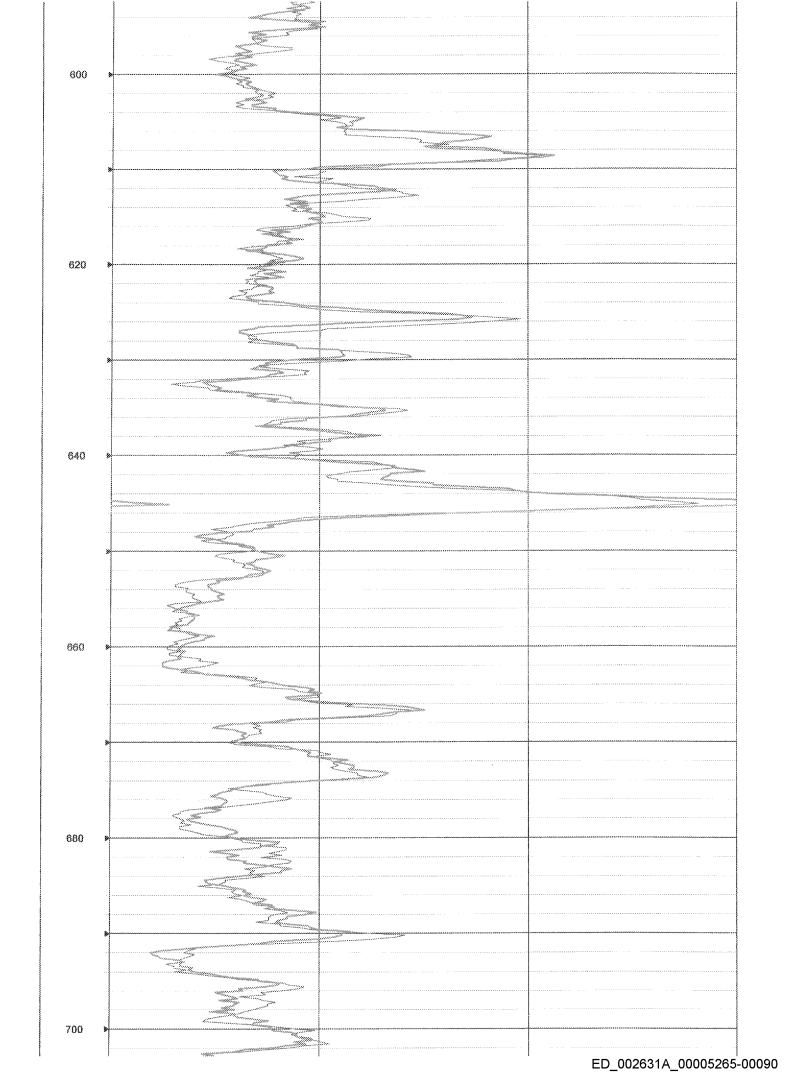


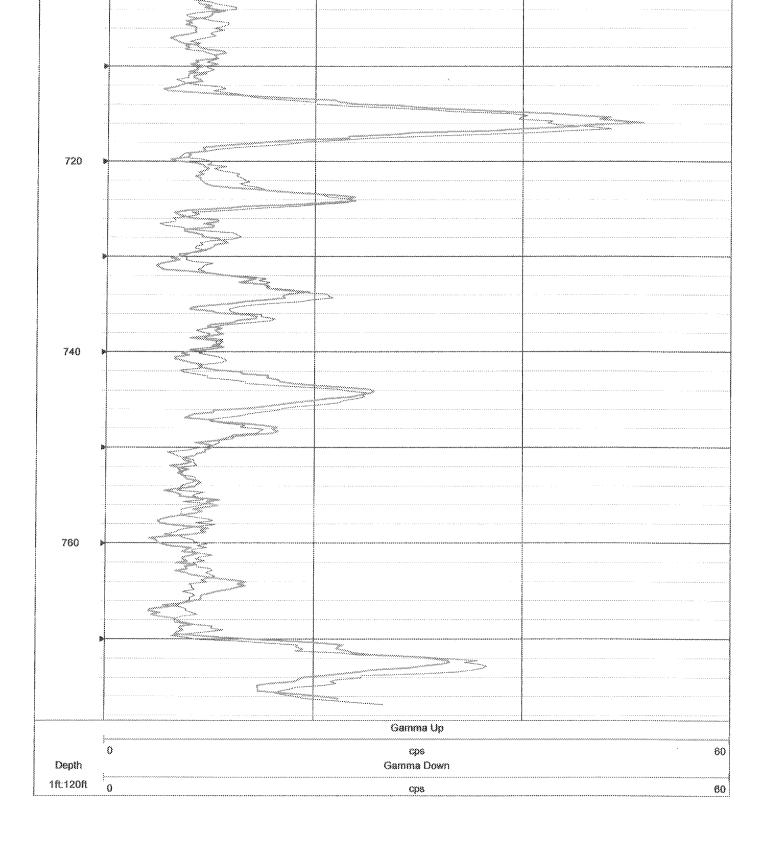










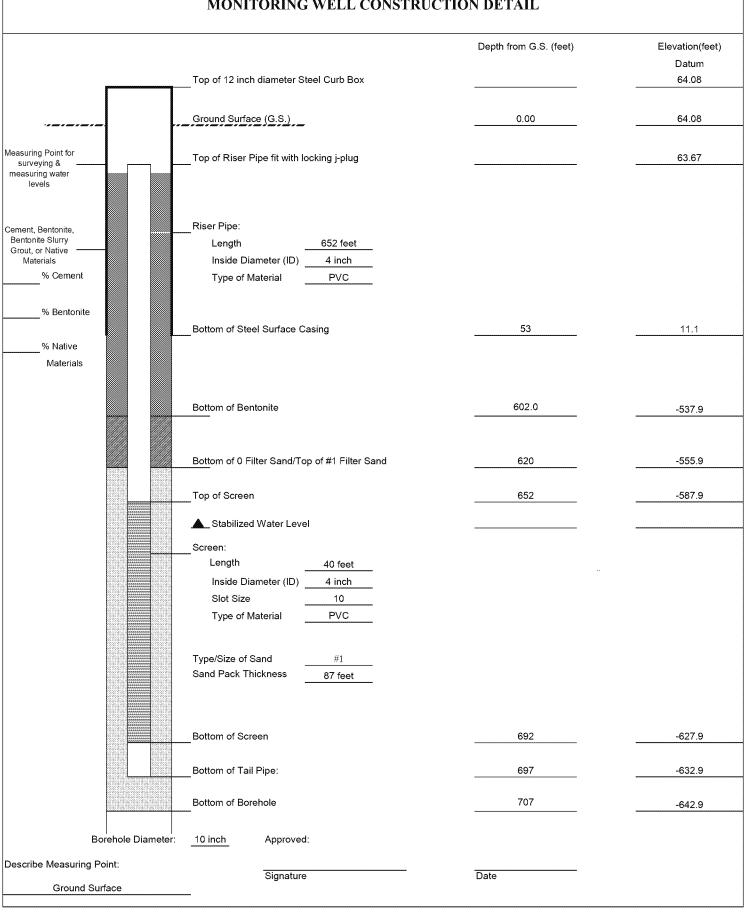


# Section 2 Monitoring Well Construction Logs



Client:	NAVFAC	Project Number:	Project Number: 60266526		LID: BPOW4-1R
Site Locati	ion: NWIRP BETHPAC				
Well Loca	tion: Elm Dr. W. and Eden	Date Installed:	8/19/14		
Method:	MUD ROTARY	Inspector:	G. HICKS		
Coords:	Northing: 1123067.502	Easting: 200281	.258	Contractor:	DELTA WELL & PUMP

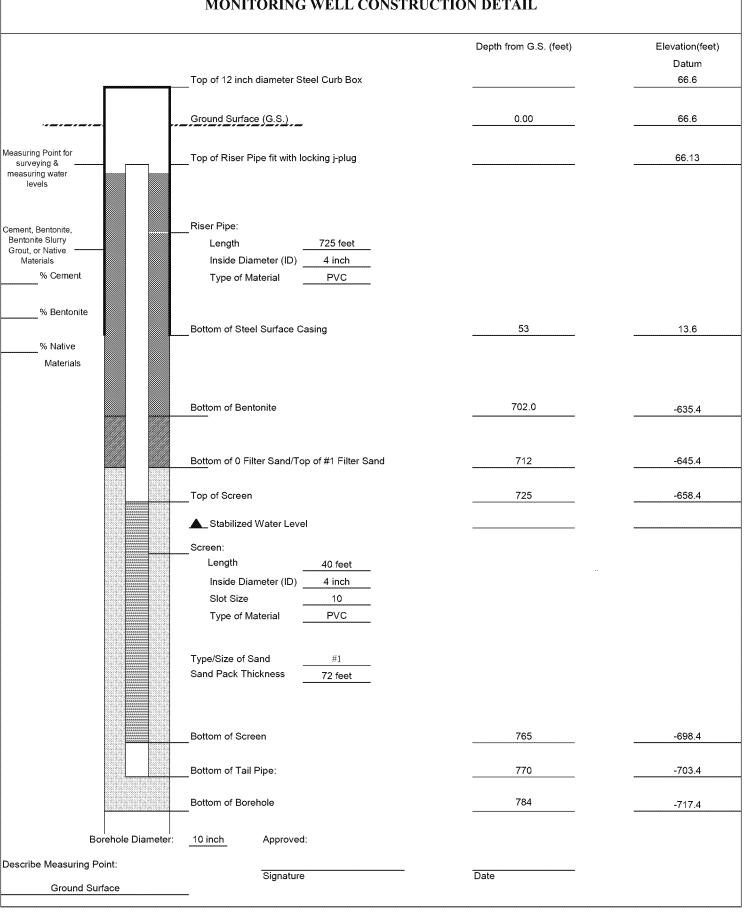
#### MONITORING WELL CONSTRUCTION DETAIL





Client:	NAVFAC Pro	ject Number:	60266526	WELL ID: BPOW4-2R	
Site Locati	on: NWIRP BETHPAGE, N	JY			
Well Loca	tion: Elm Dr. W. and Elbow Ln	Date Installed: 10/20/14			
Method:	MUD ROTARY	Inspector: V. THAYER			
Coords:	Northing: 200691.906 Eas	sting: 1123200.04	43	Contractor: DELTA WELL & PUMP	

#### MONITORING WELL CONSTRUCTION DETAIL



Section 3
Well Development Record

### Well Development Record

Well name/assoc, soil boring #: BPOW4 - 1R

Client/project: NWIRP-Bethpage

Air development

Tubing depth:

Initial water level:

Date/Time	Turbidity (NTU)	Total volume purged (gal.)	Comments (field employee, tubing depth changes, purge rate groundwater appearance/odour)
9-17/0930	21,100	20gal/min.	Gordon Hicks + Jellos Water very sury
9-17-14/300	28,13	~ J Ø 0 0 g 1	<i>y</i>
7-17-14/1330	21.41	6,500	
	· ·		

Final water level: 24.5 fbgs

### Pump development

Date(s):

9-18-14 - 9-19-19

Initial water level: 28.51

Time	Turbidity (NTU)	Total volume purged (gal.)	Comments (field employee, screen zone depths, tubing depth, purge rate groundwater appearance/odour)
9-18-14/1100	27.52		pump of 652 foos (top of screen)
9-1 <b>1</b> -14/ppa	25. IP		nume at 655
1-11-1-1/120.	32.17		662
I-16-17/1230	17.19		667
9-16-14/3**	14.13	3000	672
1-11-11/123	4,41	***************************************	692; Listing Stable

Final water level: 25.19

#### Well Development Record BPOW4-2R

#### Air and Pump Development

Data	Air Development	Pump D	evelopment	Approximate Total	Final Turbidity
Date	Approximate	Final Pump	Pumping Rate	Development Volume	(NTUs)
	Volume (Gal)	Depth (ft)	(gal/min)	(gal)	
Oct 21 2014	4025				
Oct 22 2014		725'	11 gal/min		151
Oct 22 2014		730'	11 gal/min		172.8
Oct 22 2014		735'	11 gal/min	4000	175.1
***************************************		***************************************	***************************************		
Oct 23 2014		735'	11 gal/min		123.6
Oct 23 2014		740'	11 gal/min		121.5
Oct 23 2014		745'	11 gal/min	5600	107.9
Oct 24 2014		750'	11 gal/min		152.6
Oct 24 2014		755'	11 gal/min		145.2
Oct 24 2014		760'	11 gal/min		131.1
Oct 24 2014		765'	11 gal/min	5000	137.4
Oct 24 2014		770'	11 gal/min		134

Approximate Total Development Volume by air lifting and pumping = 18,625 gallons

#### **PH and Conductivity**

Date	Depth (ft bgs)	рН	Conductivity (μS/cm)	Turbidity (NTUs)	Comments
October 23 2014	***************************************				
14:25	745			133.3	
14:30	745	7.63	38		
14:45				127.4	
October 24 2014					
13:50	765	5.00	29	183.8	
					PH meter is not working correctly on
14:10	765	4.77	27		YSI
15:00	765	8.30	34	162.5	Replacement YSI
15:05	765	7.89	32	172.5	
15:10	765	7.58	31	148	
15:15	765	7.18	30	140	
15:20	770	7.00	30	134	

# Section 4 Groundwater Sample Log Sheets

Well ID: BPOW 4-1R

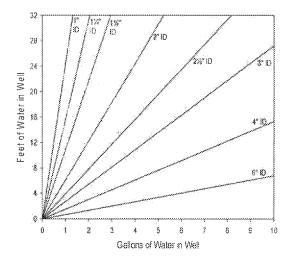
#### AECOM

### **Low Flow Ground Water Sample Collection Record**

Client: Project N Site Loca	o: <u>60</u>	<u>3elloa</u> 1 <u>7665</u> Uwif	76	Betheage	C	)ate: <i>[</i> Z	130/14	Tin	ne: Start <u>I</u> I Finish <u>I6</u>	***************************************
1	Conds:	·····	<u> 176</u>	Omph	(	Collector(s)	):	7H/5c		***************************************
a. Tota	al Well Ler	ngth_6	97	c. Length of	of Casin Water Col	<b>g)</b> _{umn} <u>6</u> 75.	اک (a-b)		Casing Diam	eter/Material
		:	21.88	d. Calculated	l <del>Systo</del> m \	∕olume (see	back)	26991		
	. <b>PURGE E</b> ge Method		God	ech bladd	v pung	301/	drop to	be.		
	perature	3%	.0 unit	(see workplan) -D.O. - ORP - Drawdown	10% ± 10m	۱V				
c. Fiel	d Testing	Equipm	ent use		ake		Model		Serial	Number
			***	YSi Hanna			6920 turbiditi	Var ter		
	Volume		***	***************************************		······································				***************************************
<u>Time</u> (24hr)	Removed (Liters)	Temp. (°C)	pН	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odo
1715	T	T —	, agentum	T	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		T	T	21.88	
1550		11.721	5-60	0.053	4.71	233.6	8. _Z	250		Clear /N
1230		11.75	5.59	००३	4.93	234.1	6.9	7750		11
17.40		11.90	5.53	0.049	5.00	Z34.0	3.8	350	···	1
1250		17.18	5.47 5.43	0.047	5.06	237.5	5.6	730	Gia.	17
1310		15-26		0.046	S:12	239.5	7.0	350 350	21.93	
***************************************	ceptance c	ofoogooooooooooo	*************		Yes N	<u>243.1</u> 0	<u> </u>	<u> </u>	£1.75	(continued on ba
Ha	s required s required ve parame If no or N	turbidit ters sta	y been r ibilized	eached						
3. SAMP	LE COLLI	ECTION	l: /	Method:	Studder 9	YUMP .	te Flor	6 laddir	- Fubin	<b>4</b>
Sample II W4-IR-GW		ntainer		No. of Conta	ainers	Prese	rvation	Analysi D <i>iòx</i>	s Req. anc 1,4	Time 1605
4 <u>-12-66-1</u> 2	17614 <b>4</b>	Oml	VUA	3			íci	VOC		1605
Comment	s_w ₁	<i>K</i> /	<i>в</i> 12	15						
***************************************					***************************************					***************************************
***************************************										

#### Purge Volume Calculation

(continued from front)



Volume /	Linear F	t. of Pipe
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

Commuea	•									
	Volume									
Time	Removed	Temp	pН	Spec. Cond.	DO	ORP	Turbidity	Flow Rate	Drawdown	Color/Odor
(24 hr)	(Liters)	(°C)		(μS/cm)	(mg/L)	(mV)	(NTU)	(ml/min)	(ft)	
1370	%c	12.24	5.41	O.OUS	5.14	243.6	1.3	250	1901111-	Clear / None
1370	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	17.31	5.41	0.044	5.14	342.1	1.3	250	copera	٤,
1340	21.25	12.27	5.40	0.044	5.[]	748.7	1.7	750	21.91	
७४६१	·~·	12.27	S-40	0.034	512	7251.9	1.3	2%	Maria.	ł e.
1400	800	12.25	5.40	0.034	5.09	7251.4	1.3	7 <i>\$</i> 2		£ 3
1410	31.25	12.75	5.39	O1033	5.07	757.3	1.2	<b>5</b> 20	22.04	'y ≰
1470	-	12.24	5.39	0.034	4.99	228.9	1.1	575	72.04	, <b>(^</b>
1970	42.75	17.25	5:40	0.034	u. 91	254.3	<i>O.</i> ។	575	647-	· •
150c	***	12.41	5.43	0.034	5-36	261.6	1.1	575	22.11	11
1570	~	12.09	5.49		4.43	263.1	1.8	575	72.11	1 5
1545		17.00	8.53	0.036	<b>4.</b> 24	761.1	2.6	575	77.11	
ISST	gar.	12,45	8.56	0.037	4.15	756.2	1.9	575	2211	. 11
1600	299	12,55	\$,54	0.037	4.21	72.535.70	2.4	575	22.11	11
										······································
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Well ID: BPOW 4-2R

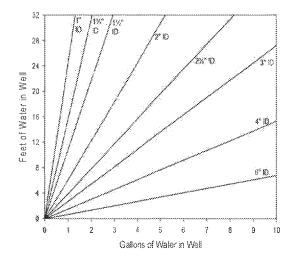
#### **AECOM**

## **Low Flow Ground Water Sample Collection Record**

Site Location:   N WIRF   Seth page   Collector(s):   C7H   SC	Client: Project N	****	ethpa 07/10	****		D	ate: 12/	30/14	Tin	ne: Start <u>/c</u>	*****
Weather Conds:   32 ° F   N @ 10 mph   Collector(s):   C7H / 3C	1 -	*******************************	********	*************	· M. Pinaz					rmsn_[	<u>{ \$0</u> am/
1. WATER LEVEL DATA: (measured from Top of Casing)   a. Total Well Length   770   c. Length of Water Column   746.68   (a-b)   Casing Diameter/Mate   V   P PV     b. Water Table Depth   23.34   d. Calculated System Volume (see back)   76.94     2. WELL PURGE DATA   a. Purge Method:   Green tech   Standard pump   W   Grey   Fv   b.     b. Acceptance Criteria defined (see workplan)   Temperature   3%   -D.O.   10%   -PH   +1.0 unit   -ORP   +10mV   -Sp. Cond.   3%   -Drawdown   < 0.3     c. Field Testing Equipment used:   Make   Model   Serial Number   Volume   Turbidity   Multive   Volume   Turbidity   Flow Rate   Drawdown   Color/C (mg/L)   (mg/L)   (my/L)   (my/L)   (my/min)   (reet)   (my/L)   (my/L)   (my/L)   (my/min)   (reet)   (my/L)   (my/L)   (my/L)   (my/L)   (my/min)   (reet)   (my/L)   (my/L)   (my/L)   (my/min)   (reet)   (my/L)   (my/L)   (my/L)   (my/L)   (my/min)   (reet)   (my/L)    3	Conds:	37°F	, N	9 10 mps		Collector(s)	G	H/50			
a. Total Well Length 770 c. Length of Water Column 746.68 (a-b)	4 MATE	n i evei		/	and from Ton	***************************************		***************************************	***************************************	••••••••••••••••••	
Dec				•	_			√ (a-b)			eter/Materia
2. WELL PURGE DATA  a. Purge Method:				3005AAA55000000000000		Screen	30052200220022002	***************************************	71/ .	4"	PVC
a. Purge Method:	b. Wa	ter Table D	Pepth Z	3.34	d. Calculated	l S <del>ystem</del> V	/olume (see	back)	16991		***************************************
b. Acceptance Criteria defined (see workplan) - Temperature 3% -D.O. 10% - pH +1.0 unit -ORP +10mV - Sp. Cond. 3% -Drawdown < 0.3'  c. Field Testing Equipment used: Make VSI G970  Handax Turbidity   Make VSI G970    Handax Turbidity   Make VSI G970   Handax Turbidity   Make VSI G970   Handax Turbidity   Make VSI G970   Handax Turbidity   Make VSI G970   Handax Turbidity   Make VSI G970   Handax Turbidity   Make VSI G970   Handax Turbidity   Flow Rate   Drawdown   Color/O (mg/L) (mV) (mV) (mV) (mV) (mV) (mV) (mV) (mV	2. WELL	PURGE D					,				
- Temperature	a. Pur	ge Method	<u> </u>	geo tect	L bladdyr i	ownp v	v/dop	tube		***************************************	***************************************
- Temperature	b. Acc	eptance C	riteria c	defined (	see workplan)	ı					
C. Field Testing Equipment used:    Make			3%	)	-D.O.	10%					
C. Field Testing Equipment used:   Make   Model   Serial Number   Volume   Turbudity   Make   Volume   Turbudity   Make   Volume   Turbudity   Make   Turbudity   Make   Volume   Turbudity   Make   Volume   Turbudity   Make   Drawdown   Color/O   (uslvm)	- pH		<u>+</u> 1				ıV				
Volume   Time   Removed Temp.   pH   Spec. Cond.   DO   ORP   Turbidity   Flow Rate   Drawdown   Color/C	- Sp. (	Cond.	3%	)	- Drawdown	< 0.3'					
Volume   Time   Removed Temp.   pH   Spec. Cond.   DO   ORP   Turbidity   Flow Rate   Drawdown   Color/C	c. Fiel	d Testing I	Equipm	ent used		ake		Model		Serial	Number
Volume   Removed   Temp.   pH   Spec. Cond.   DO   (mg/L)   (m/V)   (mIV)   Flow Rate   Drawdown   Color/O   (mg/L)   (mV)   (mV)   (mIV)   (mI/min)   (feet)   (mV)   (mV)   (mIV)   (mI/min)   (feet)   (mV)   (mV)   (mIV)   (mIV/min)   (feet)   (mV)   (mV)   (mV)   (mIV/min)   (feet)   (mV)   (mV)   (mV)   (mV)   (mV/min)   (feet)   (mV)   (mV)   (mV/min)   (feet)   (		Ĭ		- 1000				6970			
Time   Removed Temp.   PH   Spec. Cond.   DO   ORP   Turbidity Flow Rate   Drawdown   Color/O   (24hr)   (Liters) (°C)   (µS/cm)   (my/L)   (mV)   (MTU)   (m/l/min)   (feet)   (1000					Hanna		70.	bidity 17u	}		***************************************
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13   13   13   13   13   13   13   13	\$0000000000000000000000000000000000000	<del> </del>	g		<u> </u>				<b>}</b>		<b></b>
1310   1991   13.40   5.08   0.075   4.95   730.8   62.1   500   5   11   132.5   70.91   13.20   5.06   0.035   4.99   737.5   56.9   500   5   11   12   12   12   12   12   12	ş	<b>}</b>	***************************************	····		<del>{</del>	<del></del>	***************************************	······		ŧ
1325   7099   13.29   5.06   5.035   4.99   237.5   56.9   560   9   9     d. Acceptance criteria pass/fail   Yes No N/A (continued or Has required volume been removed	\$0000000000000000000000000000000000000			<u> </u>	***************************************		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·····	·····		ļ
d. Acceptance criteria pass/fail  Yes No N/A  Has required volume been removed  Has required turbidity been reached  Have parameters stabilized  If no or N/A - Explain below.  Volume paraged  3. SAMPLE COLLECTION: Method: Bladder pamp teflon bladder to bing  Sample ID Container Type No. of Containers  Preservation Analysis Req. Time  (4-7.R-6-W-173014 IL AG  2 Dioxane 1, 4 14/30		***************************************						·	***************************************	**************************************	<b>}</b>
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#### Purge Volume Calculation

(continued from front)



٠.			
	Volume /	Linear F	t. of Pipe
-	ID (in)	Gallon	Liter
Section 2	0.25	0.0025	0.0097
-	0.375	0.0057	0.0217
Section 2	0.5	0.0102	0.0386
-	0.75	0.0229	0.0869
Section 200	1	0.0408	0.1544
-	1.25	0.0637	0.2413
-	1.5	0.0918	0.3475
Contractor of the last	2	0.1632	0.6178
-	2.5	0.2550	0.9653
-	3	0.3672	1.3900
	4	0.6528	2.4711
-	6	1.4688	5.5600

COMMISSION	nom nom,									
	Volume									
Time	Removed	Temp	pΗ	Spec. Cond.		ORP	Turbidity		Drawdown	Color/Odor
(24 hr)	(Liters)	(°C)	·····	(μS/cm)	(mg/L)	(mV)	(NTU)	(ml/min)	(ft)	
1340	22941	17.66	5,40	0.034	4.75	778.6	68.2	400	rnu.	11.
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1430	26 991	12.47	5,00	0.035	4.62	241.4	66.3	, ggpar	upon"	8 į
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#### Section 5

#### **BPOW4-1R and BPOW4-2R Analytical Data Validation**

- Analytical Data Sheets
- Chain of Custody Records
- Validation Letter and Table



#### **Data Validation Report**

Project:	Regional Groundwater Investiga	ation - NWIRP Bethpage
Laboratory:	Katahdin Analytical	
Service Request:	SH5941	
Analyses/Method	: EPA SW-846 Method 8260B for Total Organic Carbon by High-T	VOCs (GC/MS) and Standard Method 5310 for emperature Combustion
Validation Level:	3	
AECOM Project Number:	60266526.SA.DV	
Prepared by:	Dawn Brule/RESCON	Completed on: 12/18/2014
Reviewed by:	Lori Herberich/RESCON	File Name: SH5941_5310B and 8260B

#### **SUMMARY**

The samples listed below were collected by Resolution Consultants from the Regional Groundwater Investigation - NWIRP Bethpage site on July 31, 2014.

Sample ID	Matrix/Sample Type
BP0W4-2R-FB-073114	Field blank
TRIP BLANK_07312014	Trip Blank

The samples were analyzed in accordance with:

- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846, Method 8260B, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (USEPA, 1996).
- Standard Methods for the Examination of Water and Wastewater, Method SM5310B, Total Organic Carbon by High-Temperature Combustion

Data validation activities were conducted with reference to these methods, USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008), USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010), and Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (DoD, October 2010) where applicable. In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

#### **REVIEW ELEMENTS**

The data were evaluated based on the following review elements (where applicable to the method):

- ✓ Data completeness (chain-of-custody [COC])/sample integrity
- ✓ Holding times and sample preservation
- ✓ GC/MS performance checks
- X Initial calibration/continuing calibration verification

- ✓ Laboratory blanks/equipment blanks/trip blanks
- X Surrogate spike recoveries
- NA Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS) results
- NA Field duplicate results
- ✓ Internal standard results
- ✓ Sample results/reporting issues

The symbol ( ) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol ( X ) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

#### **RESULTS**

#### Data Completeness (COC)/Sample Integrity

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

#### **Holding Times and Sample Preservation**

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

#### **GC/MS Performance Checks**

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. The QC acceptance criteria were met.

#### Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

 the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r²), and/or response factor method acceptance criteria were met;

- the initial calibration verification (ICV) percent recovery (%R) criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and/or
- the retention time method acceptance criteria were met.

Nonconformances are summarized in Attachment A in Tables A-1 and A-2.

Data qualification to the analytes associated with the specific ICAL and/or CCV was as follows:

#### **ICAL Linearity Nonconformances:**

Nonconformance		Actions
	Detected Results	Nondetected Results
%RSD > 15% and quantitation based on mean RF	J	UJ
r or r ² < 0.99 and quantitation based on linear regression	J*	UJ*
* No guidance in NFG, thus professional judgment was use	d	***************************************

#### **ICV Recovery Nonconformances:**

Nonconformance		ctions
Noncomoniance	Detected Compounds	Nondetected Compounds
%R > 120%	J	No qualification
20% < %R < 80%	J	UJ
%R <20% (see note)	J	R*

Notes: Based on NFG 2008 VOC guidance, professional judgment is used to reject (R) nondetects in all associated samples for any analyte with < 20% recovery. Also, professional judgment is used to estimate (UJ) rather the reject (R) sample results previously negated (U) on the basis of blank contamination.

Qualified sample results are shown in Table 1.

#### Laboratory Blanks/Equipment Blanks/Trip Blanks

Laboratory method blanks, equipment rinsate and trip blanks were evaluated as to whether there were contaminants detected above the detection limit (DL). An equipment blank was not submitted with the samples in this data set.

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Method, field, and trip blank results were reviewed for conformance with the QC acceptance criteria. Detected results in blanks are not discussed in this data validation report if the associated results were nondetect or if qualification of sample results was not required. The QC acceptance criteria were met and/or qualification of the sample results was not required.

#### Surrogate Spike Recoveries

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria.

Nonconformances are summarized in Attachment A in Table A-3.

Data qualification on the basis of surrogate recovery nonconformances was as follows:

	Action	
Nonconformance	Detected Compounds	Nondetected Compounds
%R > Upper Limit (UL)	J	No qualification
20% ≤%R < Lower Limit (LL)	J	UJ
%R < 20%	J	R

Qualified sample results are shown in Table 1.

#### MS/MSD Results

MS/MSD analyses were not performed on samples reported in this SDG. There were no validation actions taken on this basis.

#### LCS Results

The LCS %Rs were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### Field Duplicate Results

There were no field duplicate samples submitted with this data set. No validation actions were taken on this basis.

#### Internal Standard Results

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### Sample Results/Reporting Issues

Compounds that were not detected in the sample are reported as not detected (U) at the Limit of Detection (LOD).

Compounds detected at concentrations less than the LOQ but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Any sample that was analyzed at a dilution due to high concentrations of target or non-target compounds or matrix interferences was checked to ensure that the results and/or sample specific LODs and LOQs were adjusted accordingly by the laboratory.

#### **QUALIFICATION ACTIONS**

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

#### **ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

**Table 1 - Data Validation Summary of Qualified Data** 

Sample ID	Matrix	Compound	Result	LOD	Units	Validation Qualifiers	Validation Reason
BP0W4-2R-FB-073114	WQ	1,2-DIBROMO-3-CHLOROPROPANE		0.75	UG/L	UJ	С
BP0W4-2R-FB-073114	WQ	ACETONE		2.5	UG/L	UJ	С
BP0W4-2R-FB-073114	WQ	CHLOROFORM	1.2	0.50	UG/L	J	S
TRIP BLANK_07312014	WQ	1,2-DIBROMO-3-CHLOROPROPANE		0.75	UG/L	UJ	С
TRIP BLANK_07312014	WQ	ACETONE		2.5	UG/L	UJ	С

#### Attachment A

# **Nonconformance Summary Tables**

# Table A-1 - Initial Calibration

Calibration Date/Time	Compound	% RSD	Limits
31-JULY-2014 08:18	ACETONE	23	<u>≤</u> 15%
Associated samples: all samples in SI	OG SH5941		

#### Table A-2 - Initial Calibration Verification Standard

ICV ID	Compound	% R	Limits
WG147424-8	1,2-DIBROMO-3-CHLOROPROPANE	79	80-120%
Associated samples: all sam	ples in SDG SH5941	•	

Table A-3 - Surrogates

Sample ID	Surrogate	% Recovery	Lower Limit	Upper Limit
BP0W4-2R-FB-073114	1,2-DICHLOROETHANE-D4	131	70	120
BP0W4-2R-FB-073114	DIBROMOFLUOROMETHANE	126	85	115
BP0W4-2R-FB-073114	TOLUENE-D8	122	85	120

# Attachment B

# **Qualifier Codes and Explanations**

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

#### Attachment C

# **Reason Codes and Explanations**

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
С	Calibration issue
со	Analyte carryover
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
1	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
.1	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
р	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
S	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
X	Percent solids
у	Serial dilution results
Z	ICS results



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# **CHAIN of CUSTODY**

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Client: ENSAFE Lab ID: SH5941-1RA

Client ID: BP0W4-2R-FB-073114 Project: Navy Clean WE15-03-06 NW

SDG: SH5941

Lab File ID: T2023.D

Sample Date: 31-JUL-14 Received Date: 01-AUG-14 Extract Date: 04-AUG-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG147612 Analysis Date: 04-AUG-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJLOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	w us	2.5	ug/L	Í	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	J	1.2	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L		5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	I	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50
2-Hexanone	U	2.5	ug/L	1	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1 .	1.0	0.21	0.50

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NAIVTICAL SERVICES



# Report of Analytical Results

Client: ENSAFE Lab ID: SH5941-1RA

Client ID: BP0W4-2R-FB-073114 Project: Navy Clean WE15-03-06 NW

**SDG:** SH5941

Lab File ID: T2023.D

Sample Date: 31-JUL-14 Received Date: 01-AUG-14 Extract Date: 04-AUG-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG147612 Analysis Date: 04-AUG-14

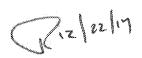
Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	** UJ	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		104.	%					
Toluene-d8	*	122.	%					
1,2-Dichloroethane-d4	*	131.	%					
Dibromofluoromethane	*	126.	%					





NALYTICAL SERVICES



# Report of Analytical Results

Client: ENSAFE Lab ID: SH5941-2

Client ID: TRIP BLANK

Project: Navy Clean WE15-03-06 NW

SDG: SH5941

Lab File ID: T2001.D

Sample Date: 31-JUL-14 Received Date: 01-AUG-14 Extract Date: 01-AUG-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG147482 Analysis Date: 01-AUG-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	I	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	Ĺ	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	ţ	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	Í	5	5.0	1.1	2.5
Acetone	we uj	2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	į	1	1.0	0.36	0.50
1,1-Dichloroethane	U	. 0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	Į.	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	Ĺ	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	İ	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	ľ	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	Ĭ.	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	Ĭ	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	Ĭ	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	Í	1	1.0	0.30	0.50
2-Hexanone	U	2.5	ug/L	1-	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	l	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	I	1.0	0.21	0.50

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NALVTICAL SERVICES



# Report of Analytical Results

Client: ENSAFE Lab ID: SH5941-2

Client ID: TRIP BLANK

Project: Navy Clean WE15-03-06 NW

SDG: SH5941

Lab File ID: T2001.D

Sample Date: 31-JUL-14 Received Date: 01-AUG-14 Extract Date: 01-AUG-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG147482 Analysis Date: 01-AUG-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 05-AUG-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	19	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	4- 71	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		89.4	%					
Toluene-d8		105.	%					
1,2-Dichloroethane-d4		110.	%					
Dibromofluoromethane		111.	%∪					*.2







Cent No E87604

Client: Rick Purdy AECOM 701 Edgewater Drive

Wakefield,MA 01880

Report Date: 09-AUG-14 Lab Sample ID: SH5941-1

Client PO: 16518

Project: Navy Clean WE15-03-0

SH5941 SDC:

Date Received Date Sampled Matrix

Prep. Method Prep. Date Footnotes N/A 01-AUG-14 X/X WG147793 07-AUG-14 03:20:38 31-JUL-14 Anal. Date Anal. Method QC.Batch Å SM5310B Adj MDL Adj LOD ٧. 0.10 Adj 1.00 0.1 30.24 mg/L Result BP0W4-2R-FB-073114 Sample Description

Total Organic Carbon

Parameter



# **Data Validation Report**

Project:	Regional Groundwater Investigation	- NWIRP Bethpage	
Laboratory:	Test-America, South Burlington, Vermont		
Service Request:	200-23996		
Analyses/Method:	EPA Method TO-15, VOCs Collected in Canisters - GC/MS		
Validation Level:	Limited		
RESCON Project Number:	60266526.SA.DV		
Prepared by:	Sheena Blair/RESCON	Completed on: 09/23/2014	
Reviewed by:	Lori Herberich/RESCON	File Name: 200-23996_TO-15	

#### **SUMMARY**

The sample listed below was collected by Resolution Consultants from the Regional Groundwater Investigation - NWIRP Bethpage site on September 2, 2014.

Sample ID	Matrix/Sample Type	
BP0W4-2R-AIR090214	Ambient Air	

Data validation activities were conducted with reference to *Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)* (USEPA, Method TO-15) and the *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

#### **REVIEW ELEMENTS**

The data were evaluated based on the following review elements (where applicable to the method):

- ✓ Data completeness (chain-of-custody [COC])/sample integrity
- ✓ Holding times and sample preservation
- ✓ GC/MS performance checks
- ✓ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks
- NA Matrix duplicate (MD) results
- ✓ Laboratory control sample (LCS) results
- NA Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol ( ) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this

validation and therefore not reviewed. The symbol ( $\chi$ ) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. There were no data points qualified or rejected on the basis of this data review.

#### **RESULTS**

#### **Data Completeness**

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

#### **Holding Times/Sample Preservation**

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

#### **GC/MS Performance Checks**

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. The QC acceptance criteria were met.

#### Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r²), and/or response factor method acceptance criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and
- * the retention time method acceptance criteria were met.

The QC acceptance criteria were met.

#### **Laboratory Blanks**

Laboratory method blanks were evaluated as to whether there were contaminants detected above the detection limit (DL). Blank results were reviewed for conformance with the QC acceptance criteria. Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Resolution Consultants 3

The QC acceptance criteria were met; qualification of the sample results was not required.

#### MS/MSD Results

MS/MSD analyses were not performed on samples reported in this SDG. There were no validation actions taken on this basis.

#### **LCS Results**

The LCS recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### **Field Duplicate Results**

There were no field duplicate samples submitted with this data set. No validation actions were taken on this basis.

#### **Internal Standard Results**

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### Sample Results/Reporting Issues

Compounds that were not detected in the sample are reported as undetected (U) at the Limit of Detection (LOD).

Compounds detected at concentrations less than the LOQ but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Any sample that was analyzed at a dilution due to high concentrations of target or non-target compounds or matrix interferences was checked to ensure that the results and/or sample specific LODs and LOQs were adjusted accordingly by the laboratory.

#### **QUALIFICATION ACTIONS**

No sample results were qualified as a result of this data review.

#### **ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

# Attachment A

# **Nonconformance Summary Tables**

No nonconformances were identified during this review.

# Attachment B

# **Qualifier Codes and Explanations**

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
ΠΊ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

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09/15/2014

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#### **Analytical Data**

Client: Katahdin Analytical Services

Job Number: 200-23996-1

Sdg Number: 200-23996

Client Sample ID:

BP0W4-2R-AIR090214

Lab Sample ID:

200-23996-1

Client Matrix:

Air

Date Sampled: 09/02/2014 1601

Date Received: 09/04/2014 1040

Analysis Method:

TO-15

Analysis Batch:

200-77123

Instrument ID:

CHG.i

Prep Method: Dilution:

Summa Canister

Prep Batch:

N/A

Lab File ID:

9408_011.D

Initial Weight/Volume:

298 mL

Analysis Date:

Result (ppb v/v)

Final Weight/Volume:

200 mL

Prep Date:

09/11/2014 1935 09/11/2014 1935

200 mL

Analyte
1,1,1-Trich
1,1,2,2-Tet
1,1,2-Trich
1,1,2-Trich
1,1-Dichlor
1,1-Dichlor
1,2,4-Trich
1,2-Dibrom
4 O Disklass

loroethane

Injection Volume: Qualifier DL LOQ

Midiyie	izeagir (bho ara)	Quanter	ν	LOG
1,1,1-Trichloroethane	0.080	U	0.20	0.20
1,1,2,2-Tetrachloroethane	0.030	U	0.20	0.20
1,1,2-Trichloro-1,2,2-trifluoroethane	0.030	U	0.20	0.20
1,1,2-Trichloroethane	0.030	U	0.20	0.20
1,1-Dichloroethane	0.080	U	0.20	0.20
1,1-Dichloroethene	0.080	U	0.20	0.20
1,2,4-Trichlorobenzene	0.080	U	0.50	0.50
1,2-Dibromoethane (EDB)	0.080	U	0.20	0.20
1,2-Dichlorobenzene	0.030	U	0.20	0.20
1,2-Dichloroethane	0.030	U	0.20	0.20
1,2-Dichloropropane	0.080	U	0.20	0.20
Acetone	6.6		5.0	5.0
1,3-Dichlorobenzene	0.030	U	0.20	0.20
1,4-Dichiorobenzene	0.030	U	0.20	0.20
2-Butanone (MEK)	0.94		0.50	0.50
2-Hexanone	0.20	U	0.50	0.50
4-Methyl-2-pentanone	0.080	U	0.50	0.50
Benzene	0.35		0.20	0.20
Bromoform	0.030	U	0.20	0.20
Bromomethane	0.080	Ü	0.20	0.20
Carbon disulfide	0.20	Ü	0.50	0.50
Carbon tetrachloride	0.080	U	0.20	0.20
Chlorobenzene	0.030	Ū	0.20	0.20
Dibromochloromethane	0.030	Ū	0.20	0.20
Chloroethane	0.080	Ü	0.50	0.50
Chloroform	0.080	Ü	0.20	0.20
Chloromethane	0.70		0.50	0.50
cis-1,2-Dichloroethene	0.080	U	0.20	0.20
cis-1,3-Dichloropropene	0.080	Ū	0.20	0.20
Cyclohexane	0.48	M	0.20	0.20
Bromodichloromethane	0.030	ű.	0.20	0.20
Dichlorodifluoromethane	0.080	Ü	0.50	0.50
Ethylbenzene	0.030	ū	0.20	0.20
Isopropylbenzene	0.030	Ū.	0.20	0.20
Methyl tert-butyl ether	0.080	ũ	0.20	0.20
Methylene Chloride	0.20	йм	0.50	0.50
m,p-Xylene	0.54	W.141	0.50	0.50
Xylene, o-	0.030	U	0.20	0.20
Styrene	0.030	Ŭ	0.20	0.20
Tetrachloroethene	0.030	Ü	0.20	0.20
Toluene	0.99	v	0.20	0.20
trans-1,2-Dichloroethene	0.080	U	0.20	0.20
trans-1,3-Dichloropropene	0.080	U	0.20	0.20
Trichloroethene	0.080	U	0.20	0.20
Trichlorofluoromethane	0.030	U	0.20	0.20
Vinyl chloride	0.23	U	0.20	0.20
viriyi Grionae	0.000	U	0.20	0.20

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# **Analytical Data**

Client: Katahdin Analytical Services

Job Number: 200-23996-1

Sdg Number: 200-23996

Client Sample ID:

BP0W4-2R-AIR090214

Lab Sample ID:

200-23996-1

Client Matrix:

Air

Date Sampled: 09/02/2014 1601 Date Received: 09/04/2014 1040

		TO-15 Volatile Organic	Compounds in	Ambient Air		
Analysis Method;	TO-15	Analysis Batch:	200-77123		ument ID:	CHG.i
Prep Method:	Summa Canister	Prep Batch:	N/A		File ID:	9408_011.D
Dilution:	1.0	r rep baten.	13/73		I Weight/Volume:	298 mL
Analysis Date:	09/11/2014 1935				Weight/Volume:	200 mL
-					•	
rep Date:	09/11/2014 1935			injec	tion Volume:	200 mL
nalyte		Result (p	pb v/v) (	Qualifier	DL	LOQ
(ylene (total)		0.54			0.20	0.20
\nalyte		Result (u	g/m3) (	Qualifier	DL	LOQ
,1,1-Trichloroethar	10	0.44	· · ·	J	1.1	1.1
,1,2,2-Tetrachloroe	ethane	0.21	ŧ	J	1.4	1.4
1,2-Trichloro-1,2,2	?-trifluoroethane	0.23	ŧ		1.5	1.5
,1,2-Trichloroethan	10	0.16	Ų	J	1.1	1.1
,1-Dichloroethane		0.32	ι	J	0.81	0.81
,1-Dichloroethene		0.32	ι	J	0.79	0.79
,2,4-Trichlorobenze	ene	0.59	t	J	3.7	3.7
,2-Dibromoethane		0.61	ŧ		1.5	1.5
,2-Dichlorobenzen		0.18	Ü		1.2	1.2
,2-Dichloroethane		0.12	Ü		0.81	0.81
,2-Dichloropropane	•	0.37	į		0.92	0.92
cetone		16	_		12	12
,3-Dichlorobenzen	e	0.18	ι	J	1.2	1.2
,4-Dichlorobenzen		0.18	Ĺ		1.2	1.2
-Butanone (MEK)	-	2.8			1.5	1.5
-Hexanone		0.82	ι	J	2.0	2.0
-Methyl-2-pentano	ne	0.33	ū		2.0	2.0
enzene		1.1	•	_	0.64	0.64
romoform		0.31	Ų	1	2.1	2.1
romomethane		0.31	į		0.78	0.78
Carbon disulfide		0.62	ì		1.6	1.6
arbon tetrachloride	<b>5</b>	0.50		J	1.3	1.3
hlorobenzene	•	0.14	ĭ		0.92	0.92
ibromochlorometh	ana	0.26	ì		1.7	1.7
hloroethane	on no	0.21	į		1.3	1.3
Chloroform		0.39	į		0.98	0.98
hloromethane		1.4	,	•	1.0	1.0
is-1,2-Dichloroethe	nna .	0.32	ι	1	0.79	0.79
		0.36		ر ل	0.79	0.79
is-1,3-Dichloroprop cyclohexane	rono	1.6	-	M	0.69	0.69
cyclonexane Bromodichlorometh	200	0.20		vi J	1.3	1.3
romodichlorometh ichlorodifluorometh		0.40	l		2.5	2.5
	iane	0.40	l.		2.5 0.87	2.5 0.87
thylbenzene						
copropylbenzene	a.r	0.15		ر •	0.98	0.98
lethyl tert-butyl eth	eı	0.29		J 134	0.72	0.72
lethylene Chloride		0.69	ľ	J M	1.7	1.7
n,p-Xylene		2.3			2.2	2.2
ylene, o-		0.13	L.		0.87	0.87
ityrene		0.13		J	0.85	0.85
etrachloroethene		0.20	Ĺ	J	1.4	1.4
oluene		3.7			0.75	0.75
rans-1,2-Dichloroet		0.32	Ų		0.79	0.79

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#### **Analytical Data**

Client: Katahdin Analytical Services

Job Number: 200-23996-1

Sdg Number: 200-23996

Client Sample ID:

BP0W4-2R-AIR090214

Lab Sample ID:

200-23996-1

Client Matrix:

Air

Date Sampled: 09/02/2014 1601 Date Received: 09/04/2014 1040

TO-15 Volatile Organic Compounds in Ambient Air

Analysis Method:

TO-15

Analysis Batch:

200-77123

Instrument ID:

CHG.i

Prep Method:

Summa Canister

Prep Batch:

N/A

Lab File ID:

9408_011.D

Dilution:

Initial Weight/Volume:

298 mL

Analysis Date:

09/11/2014 1935

Final Weight/Volume:

200 mL

Prep Date:

09/11/2014 1935

Injection Volume:

200 mL

Analyte	Result (ug/m3)	Qualifier	DL	LOQ
Trichloroethene	0.43	U	1.1	1.1
Trichlorofluoromethane	1.3		1.1	1,1
Vinyl chloride	0.20	U	0.51	0.51
Xylene (total)	2.3		0.87	0.87



# **Data Validation Report**

Project:	Regional Groundwater Investigation - N	WIRP Bethpage
Laboratory:	Katahdin Analytical	
Service Request:	SH8620	
Analyses/Method:	TOC in waters and domestic/ industrial v	GC/MS), EPA SW-846 Method 9060A for wastes(Carbonaceous Analyzer) and carbon by High-Temperature Combustion
Validation Level:	3	
AECOM Project Number:	60266526.SA.DV	
Prepared by:	Dawn Brule/RESCON	Completed on: 12/08/2014
Reviewed by:	Lori Herberich/RESCON	File Name: SH8620_5310B, 8260B and 9060A

#### **SUMMARY**

The samples listed below were collected by Resolution Consultants from the Regional Groundwater Investigation - NWIRP Bethpage site on October 7 and 8, 2014 and September 15, 2014.

Sample ID	Matrix/Sample Type
BPOW4-2R-EB-10072014	Equipment blank
BPOW4-2R-FB-10072014	Field blank
BPOW4-2R-SOIL-10072014-673-675	Soil
BPOW4-2R-SOIL-10082014-738-740	Soil
BPOW4-2R-TRIP BLANK	Trip Blank

The samples were analyzed in accordance with:

- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, Method 8260B,
   Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (USEPA, 1996).
- Standard Methods for the Examination of Water and Wastewater, Method SM5310B, Total Organic Carbon by High-Temperature Combustion
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, Method 9060A, Total Organic Carbon (USEPA, 1996).

Data validation activities were conducted with reference to these methods, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (January 2010), and Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (DoD, October 2010) where applicable. In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

#### **REVIEW ELEMENTS**

The data were evaluated based on the following review elements (where applicable to the method):

- Data completeness (chain-of-custody [COC])/sample integrity
- ✓ Holding times and sample preservation
- ✓ GC/MS performance checks
- X Initial calibration/continuing calibration verification
- X Laboratory blanks/equipment blanks/trip blanks
- Surrogate spike recoveries
- NA Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- NA Field duplicate results
- ✓ Internal standard results
- ✓ Sample results/reporting issues

The symbol ( / ) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol ( x ) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were estimated and/or negated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

#### **RESULTS**

#### Data Completeness (COC)/Sample Integrity

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Due to limitations in the reporting system, the laboratory omitted either part of or the whole "BPOW4-" prefix and truncated "Soil" in the ID for the soil samples in the report. The submitted EDD file reflects the full sample ID.

#### **Holding Times and Sample Preservation**

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

#### **GC/MS Performance Checks**

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. The QC acceptance criteria were met.

#### Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that;

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r²), and/or response factor method acceptance criteria were met;
- the initial calibration verification (ICV) percent recovery (%R) criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and/or
- the retention time method acceptance criteria were met.

Nonconformances are summarized in Attachment A in Table A-1.

Data qualification to the analytes associated with the specific ICAL and/or CCV was as follows:

#### **ICV Recovery Nonconformances:**

Nonconformance	A	ctions
Noncomonnance	Detected Compounds Nondetected Co	
%R > 120%	J	No qualification
20% < %R < 80%	J	UJ
%R <20% (see note)	J	R*

Notes: Based on NFG 2008 VOC guidance, professional judgment is used to reject (R) nondetects in all associated samples for any analyte with < 20% recovery. Also, professional judgment is used to estimate (UJ) rather the reject (R) sample results previously negated (U) on the basis of blank contamination.

Qualified sample results are shown in Table 1.

#### Laboratory Blanks/Equipment Blanks/Trip Blanks

Laboratory method blanks, equipment rinsate and trip blanks were evaluated as to whether there were contaminants detected above the detection limit (DL).

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Method, equipment rinsate and trip blank results were reviewed for conformance with the QC acceptance criteria. Detected results in blanks are not discussed in this data validation report if the associated results were nondetect or if qualification of sample results was not required.

Nonconformances are summarized in Attachment A in Table A-2.

TOC sample results were qualified as follows:

1	***************************************	***************************************	<b>*************************************</b>	<b>,</b>
	Blank Type	Blank Result	Sample Result	Action for Samples
	ICB/CCB	>DL but < LOQ	Nondetect	No action

Blank Type	Blank Result	Sample Result	Action for Samples		
(Positive)		≥DL but ≤LOQ	Qualify as nondetect (U) at the LOQ		
		>LOQ	Use professional judgment (see below [1])		
		≥DL but ≤LOQ	Qualify as nondetect (U) at the LOQ		
		> LOQ but < ICB/CCB	Qualify at level of Blank Result with a "U" or		
	1.100	Result	Qualify result as unusable		
	>LOQ	>ICB/CCB but <10x	0.17		
		the ICB/CCB result	Qualify as estimated (J)		
		≥10x ICB/CCB	No action is taken based on professional judgmen		
		≥DL but ≤ LOQ	Qualify as nondetect (U) at the LOQ		
	1.00	>LOQ but < 10x Blank	0 - 1/2 1/2 1/2 1/2		
PB / EB/ FB	> LOQ	Result	Qualify results as unusable		
(Positive)		≥10x Blank Result	No action		
•		Nondetect	No action		
	≥DL but ≤LOQ	≥DL but ≤LOQ	Qualify as nondetect (U) at the LOQ		
		> LOQ	Use professional judgment (see below [1])		

^[1] Establish an action level (AL) at 5x the blank contamination. If sample result is <AL, qualify the reported result with a U. LOQ - Limit of Quantitation.

Qualified sample results are shown in Table 1.

#### **Surrogate Spike Recoveries**

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### MS/MSD Results

MS/MSD analyses were not performed on samples reported in this SDG. There were no validation actions taken on this basis.

#### **LCS/LCSD Results**

The LCS/LCSD %Rs and/or relative percent recoveries (RPDs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### Field Duplicate Results

There were no field duplicate samples submitted with this data set. No validation actions were taken on this basis.

#### Internal Standard Results

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

#### Sample Results/Reporting Issues

Compounds that were not detected in the sample are reported as not detected (U) at the Limit of Detection (LOD).

Resolution Consultants 5

Compounds detected at concentrations less than the LOQ but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Any sample that was analyzed at a dilution due to high concentrations of target or non-target compounds or matrix interferences was checked to ensure that the results and/or sample specific LODs and LOQs were adjusted accordingly by the laboratory.

#### **QUALIFICATION ACTIONS**

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

#### **ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

Table 1 - Data Validation Summary of Qualified Data

Sample ID	Matrix	Compound	Result	LOD	Units	Validation Qualifiers	Validation Reason
BPOW4-2R-FB- 10072014	WQ	2-HEXANONE		2.5	UG/L	W	С
BPOW4-2R-FB- 10072014	WQ	4-METHYL-2-PENTANONE		2.5	UG/L	UJ	С
BPOW4-2R-SOIL- 10072014-673- 675	SO	TOTAL ORGANIC CARBON		540*	UG/G	U	bf
BPOW4-2R-SOIL- 10082014-738- 740	so	TOTAL ORGANIC CARBON		670**	UG/G	U	bf
BPOW4-2R-TRIP BLANK	WQ	2-HEXANONE		2.5	UG/L	υJ	С
BPOW4-2R-TRIP BLANK	WQ	4-METHYL-2-PENTANONE		2.5	UG/L	υJ	С

^{*}LOQ

6

^{**}sample result

# Attachment A

# **Nonconformance Summary Tables**

Table A-1 - Initial Calibration Verification Standard

icv id	Compound	% R	Limits
WG151736-7	CHLOROETHANE	131	80-120%
	4-METHYL-2-PENTANONE	73	80-120%
	2-HEXANONE	78	80-120%

#### Table A-2 - Field Blanks

Blank ID	Compound	Result	LOD	Units	Associated Samples
BPOW4-2R-FB-10072014	TOTAL ORGANIC CARBON	0.50	0.5	MG/I	BPOW4-2R-SOIL-10072014-673-675 BPOW4-2R-SOIL-10082014-738-740

#### Attachment B

# **Qualifier Codes and Explanations**

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

# Attachment C

# **Reason Codes and Explanations**

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
С	Calibration issue
со	Analyte carryover
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
ĺ	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
	LCS or OPR recoveries
lc	Labeled compound recovery
fd	Laboratory duplicate RPDs
-lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
р	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
X	Percent solids
у	Serial dilution results
Z	ICS results



600 Technology Way Scarborough, ME 04074 Tel: (207) 874-2400 Fax: (207) 775-4029

# CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

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Purchase Order #	Proj. Name / No.			************	************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Katahdi	n Quote	<del>  10-*</del> #		***************************************
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Sampler (Print / Sign) Gundan Hilland American Vol. Nevert Copies To:											
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BPOW4-ZR-FB-100720	10-7-14/ 0830 Water	6 /3	3~	/		***************************************		***************************************			
8POW4-2R-EB-108720	10-7-14/ Water 14 / 0845	3				***************************************					
BP014-2R-5012-1002	10-7-14 11340 SOIL	1						~~~			
BPOW4-2R-5011-1008	2014-1758-740ff	, –				***************************************					
BROWY-2R TRIPBA	4-15-14 / 11300 WHAR	3				•••••				***************************************	
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Date Dy. (Olgitature)	10-10	ature)	oling <b>ers</b> he	о ву: (S	ignature)	Dat	e / Tim	e A	ceived B	y: (Signa	iture)
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Client: ENSAFE Lab ID: SH8620-1

Client ID: POW4-2R-FB-10072014 Project: Navy Clean WE15-03-06 NW

**SDG:** SH8620

Lab File ID: C9445.D

Sample Date: 07-OCT-14 Received Date: 10-OCT-14 Extract Date: 10-OCT-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG151846 Analysis Date: 10-OCT-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U	0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	U	2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U	0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1	1.0	0.22	0.50
Benzene	U	0.50	ug/L	1.	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	Tu in	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	U	0.50	ug/L	L	1	1.0	0.30	0.50
2-Hexanone	4 UJ	2.5	ug/L	1	5	5.0	1.7	2.5
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50

Page 1 of 2

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Client: ENSAFE Lab ID: SH8620-1

Client ID: POW4-2R-FB-10072014 Project: Navy Clean WE15-03-06 NW

**SDG:** SH8620

Lab File ID: C9445.D

Sample Date: 07-OCT-14 Received Date: 10-OCT-14 Extract Date: 10-OCT-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG151846 Analysis Date: 10-OCT-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	999	1	1.0	0.50	0.75
P-Bromofluorobenzene		98.2	%					
Toluene-d8		104.	%					
1,2-Dichloroethane-d4		112.	%					
Dibromofluoromethane		108.	%					





Client: ENSAFE Lab ID: SH8620-5

Client ID: BPOW4-2R-TRIP BLAN Project: Navy Clean WE15-03-06 NW

SDG: SH8620

Lab File ID: C9440.D

Sample Date: 08-OCT-14 Received Date: 10-OCT-14 Extract Date: 10-OCT-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG151846 Analysis Date: 10-OCT-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 13-OCT-14

Compound	Qualif	ier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U		1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U		1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U		1.0	ug/L	1.	2	2.0	0.25	1.0
Bromomethane	U		1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U		1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U		1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U		0.50	ug/L	1	1	1.0	0.35	0.50
Carbon Disulfide	U		0.50	ug/L	1	1	1.0	0.25	0.50
Freon-113	U		0.50	ug/L	1	1	1.0	0.31	0.50
Methylene Chloride	U		2.5	ug/L	1	5	5.0	1.1	2.5
Acetone	U		2.5	ug/L	1	5	5.0	2.2	2.5
trans-1,2-Dichloroethene	U		0.50	ug/L	1.	1	1.0	0.25	0.50
Methyl tert-butyl Ether	U		0.50	ug/L	1	1	1.0	0.36	0.50
1,1-Dichloroethane	U		0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U		0.50	ug/L	1	1	1.0	0.21	0.50
Chloroform	U		0.50	ug/L	1:	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U		0.50	ug/L	1	1	1.0	0.20	0.50
2-Butanone	U		2.5	ug/L	1	5	5.0	1.3	2.5
Cyclohexane	U		0.50	ug/L	1	1	1.0	0.31	0.50
Carbon Tetrachloride	U		0.50	ug/L	ı	1	1.0	0.22	0.50
Benzene	U		0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U		0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U		0.50	ug/L	1	1	1.0	0.28	0.50
1,2-Dichloropropane	U		0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U		0.50	ug/L	Ĭ	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U		0.50	ug/L	1	1	1.0	0.19	0.50
Toluene	U		0.50	ug/L	1.	1	1.0	0.27	0.50
4-Methyl-2-Pentanone	~ <del>U</del> *	UJ	2.5	ug/L	1	5	5.0	1.3	2.5
trans-1,3-Dichloropropene	U		0.50	ug/L	1	, 1	1.0	0.20	0.50
1,1,2-Trichloroethane	U		0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U		0.50	ug/L	1	1	1.0	0.40	0.50
Dibromochloromethane	. U		0.50	ug/L	1	1	1.0	0.30	0.50
2-Hexanone	40	UT	2.5	ug/L	1,	5	5.0	1.7	2.5
Chlorobenzene	U		0.50	ug/L	I	1	1.0	0.22	0.50
Ethylbenzene	U		0.50	ug/L	1	1	1.0	0.21	0.50

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Client: ENSAFE Lab ID: SH8620-5

Client ID: BPOW4-2R-TRIP BLAN
Project: Navy Clean WE15-03-06 NW

SDG: SH8620

Lab File ID: C9440.D

Sample Date: 08-OCT-14 Received Date: 10-OCT-14 Extract Date: 10-OCT-14

Extracted By: REC

Extraction Method: SW846 5030 Lab Prep Batch: WG151846 Analysis Date: 10-OCT-14

Analyst: REC

Analysis Method: SW846 8260C

Matrix: AQ % Solids: NA

Report Date: 13-OCT-14

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Xylenes (total)	U	1.5	ug/L	1	3	3.0	0.25	1.5
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1	1.0	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1	1.0	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.37	0.50
Methyl Acetate	U	0.75	ug/L	1	1	1.0	0.53	0.75
Methylcyclohexane	U	0.50	ug/L	1	1	1.0	0.30	0.50
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
M+P-Xylenes	U	1.0	ug/L	1	2	2.0	0.59	1.0
1,2-Dichloroethylene (Total)	U	1.0	ug/L	1	2	2.0	0.21	1.0
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	1	1.0	0.50	0.75
P-Bromofluorobenzene		96.9	%					
Toluene-d8		103.	%					
1,2-Dichloroethane-d4		108.	%					
Dibromofluoromethane		106.	%					





701 Edgewater Drive Wakefield,MA 01880 Client: Rick Purdy AECOM

Report Date: 04-NOV-14 Lab Sample ID: SH8620-1

Client PO: 16518

Project: Navy Clean WE15-03-0 SDG: SH8620

	ofnotes	
eceived -14	Prep. Method Prep. Date Footnotes	N/A
Date Received	rep. Method	N/A
Date Sampled 07-OCT-14 08:30:00	Parameter Result Adj LOQ Adj MDL Adj LOD Anal. Method QC.Bstch Anal. Date Footnotes	WG152063 13-0CT-14 19:32:22
Matrix AQ	QC.Batch	WG152063
	1 LOQ Adj MDL Adj LOD Anal. Method QC.Bstch	SM5310B
	Adj LOD	<b>v</b> i
	Adj MDL	0.10
	Adj LOQ	1.0
tion 0072014	Resutt	JO.50 mg/L
Sample Description POW4-2R-FB-10072014	Parameter	Total Organic Carbon





701 Edgewater Drive Client: Rick Purdy AECOM

Wakefield,MA 01880

Report Date: 04-NOV-14 Lab Sample ID: SH8620-2

Client PO: 16518

Project: Navy Clean WE15-03-0 SDG: SH8620

Date Sampled Date Received	07-OCT-14 08:45:00 10-OCT-14
Matrix	ΑQ
	and.
Sample Description	POW4-2R-EB-100720

Footnotes	
Prep. Date	N/A
Prep. Method Prep. Date Footnotes	N/A
Anal. Date	1.0 0.10 .5 SM5310B WG152063 13-OCT-14 20:11:25 N/A N/A
QC.Batch	WG152063
Adj LOQ Adj MDL Adj LOD Anal Method QC.Bstch	SM5310B
Adj LOD	s.
Adj MDL	0.10
Adj 1.000	1.0
Result	J0.38 mg/L
Parameter	Total Organic Carbon J0.38 mg/L





Client: Rick Purdy AECOM

Wakefield, MA 01880 701 Edgewater Drive

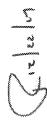
Report Date: 04-NOV-14 Lab Sample ID: SH8620-3

Project: Navy Clean WE15-03-0 SDG: SH8620 Client PO: 16518

Date Received	10-OCT-14	imeter Result Adj LOQ Adj MDL Adj LOD Anal. Method QC.Batch Anal. Date Prep. Method Prep. Date Footnotes	N/A	KG 30-OCT-14
		Prep. Me	9/N 8/A	4 SM2540G
Date Sampled	07-OCT-14 13:40:00	Anal. Date	SW846 9060A WG152215 15-OCT-14 17:15:49 Mod.	WG153116 30-OCT-14 09:29:44
Matrix	SF	QC.Batch	WG152215	WG153116
	*	100 Adj MDL Adj LOD Anal. Method QC.Batch	SW846 9060A Mod.	SM2540G
		Adj LOD	410	N/A
		Adj MDL	120	
		Adj 1.00	540	xini
щ	-675	Result Adj	Libert ug/gdrywt	85.%
Sample Description	2R-SL100714-673-675		SAO U LEST	
Sample	2R-SL1	rameter	C In Soil	al Solids

TOC In Soil Parameter

Total Solids







Client: Rick Purdy AECOM

701 Edgewater Drive Wakefield,MA 01880

Report Date: 04-NOV-14 Lab Sample ID: SH8620-4

Client PO: 16518

Project: Navy Clean WE15-03-0 SDG: SH8620

2R-SL100814-738-740 meter Re-	40 40 Reconit	Ş	Z Z	Š	S.L. S.L. Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adillon Adil		Date Sampled 08-OCT-14 15:15:00	Date Recei	Date Received 10-OCT-14	ı	
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) Jan	670 Sugygywt	999	<del>5</del>	200	SW846 9060A Mod.	WG152215	SW846 9060A WG152215 15-OCT-14 17:23:41 Mod.	N/A	N/A		
sč	84. %	oğus.		K/Z	SM2540G	WG153116	WG153116 30-OCT-14:09:29:55	SM2.540G	30-OCT-14		

TOC In Soil

Parameter

Total Solids



#### DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation —	NWIRP Bethpage
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	TH0899	
Analyses/Method:	Volatile Organic Compounds (VOCs) by Semivolatile Organic Compounds (SVO via Selective Ion Monitoring (SIM)	U.S. EPA SW-846 Method 8260C Cs) by U.S. EPA SW-846 Method 8270D
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 02/06/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: TH0899_8260C_8270D
CHMMADV		

#### **SUMMARY**

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 30 December 2014 in accordance with the following Sampling and Analysis Plans:

- Sampling and Analysis Plan, Bethpage, New York, April 2013.
- UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York, August 2014.
- UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York, November 2013.

Sample ID	Matrix/Sample Type	Analysis
BP0W4-1R-GW-123014	Ground water	8260C/ 8270D_SIM
BP0W4-2R-GW-123014	Ground water	8260C/ 8270D_SIM
TRIP BLANK_12302014	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (U.S. EPA, 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA, 2007), *U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (NFG, June 2008), and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories,



Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

#### **REVIEW ELEMENTS**

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody (COC)/sample integrity
- ✓ Holding times and sample preservation
- ✓ GC/MS performance checks
- ✓ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks/trip blanks
- ✓ Surrogate spike recoveries
- NA Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- NA Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol ( $\checkmark$ ) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (x) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

#### **Qualifications Actions**

The data was reviewed independently from the laboratory to assess data quality and no results were qualified during this data review. All compounds detected at concentrations less than the limit of quantitation (LOQ) but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. EPA guidelines and Department of Defense guidelines. Attachment A provides final results after data review.



# **ATTACHMENTS**

Attachment A: Final Results after Data Review

Attachment A
Final Results after Data Review

		Sample Delivery	Group Lab ID	TH089 TH0899 BP0W4-2R-GV	9-1
		Samp	le Date le Type	12/30/2 Groundw	014
Method	Analyte	CAS No	Units	Result	Qual
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG L	0.5	U
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG L	11	- 0
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	<del>                                     </del>
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	Ü
8260C	1,1-DICHLOROETHENE	75-35-4	UG L	0.5	T U
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG L	0.75	Ü
8260C	1,2-DIBROMOETHANE	106-93-4	UG L	0.5	T U
8260C	1,2-DICHLOROBENZENE	95-50-1	UG L	0.5	U
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	Ü
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	T U
8260C	1,2-DICHLOROPROPANE	78-87-5	UG L	0.5	U
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U
8260C	1,4-DICHLOROBENZENE	106-46-7	UG L	0.5	U
8260C	2-BUTANONE	78-93-3	UG L	2.5	U
8260C	2-HEXANONE	591-78-6	UG L	2.5	U
8260C	4-METHYL-2-PENTANONE	108-10-1	UG L	2.5	U
8260C	ACETONE	67-64-1	UG L	2.5	U
8260C	BENZENE	71-43-2	UG_L	0.5	U
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U
8260C	BROMOFORM	75-25-2	UG_L	0.5	<del>  0</del>
8260C	BROMOMETHANE	74-83-9	UG_L	1	<del>  U</del>
8260C	CARBON DISULFIDE	75-15-0	UG L	0.5	U
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U
8260C	CHLOROETHANE	75-00-3	UG L	1	U
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U
8260C	CHLOROMETHANE	74-87-3	UG L	1	U
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U
8260C	CIS-1,2-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U
8260C	CYCLOHEXANE	110-82-7	UG L	0.5	<del>  U</del>
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	T U
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U
8260C	ETHYLBENZENE ETHYLBENZENE	100-41-4	UG_L	0.5	U
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U
8260C	O-XYLENE	95-47-6	UG_L	0.5	U
8260C	STYRENE	100-42-5	UG_L	0.5	U
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U
8260C	TOLUENE	108-88-3	UG_L	0.5	U
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE TRICHLOROETHENE	79-01-6	UG_L	0.73	J
8260C 8260C		75-69-4	UG_L UG_L		U
8260C	TRICHLOROFLUOROMETHANE VINYL CHLORIDE	75-01-4	UG_L	<u>1</u>	U
8260C 8260C	XYLENES, TOTAL	1330-20-7	UG_L UG_L	1.5	U
	· · · · · · · · · · · · · · · · · · ·				<del>  U</del>
8270D	1,4-DIOXANE	123-91-1	UG_L	1.1	

		Sample Delivery	Group Lab ID	TH089 TH0899 BP0W4-1R-GV	9-2
		Samp	le Date le Type	12/30/2 Groundw	014
Method	Analyte	CAS No	Units	Result	Qual
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG L	0.5	U
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	8	- 0
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U
8260C	1,1-DICHLOROETHENE	75-35-4	UG L	0.5	U
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG L	0.75	U
8260C	1,2-DIBROMOETHANE	106-93-4	UG L	0.75	U
8260C	1,2-DIDKONOETHANE 1,2-DICHLOROBENZENE	95-50-1	UG L	0.5	U
8260C	1,2-DICHEOROBENZENE	107-06-2	UG_L	0.5	U
8260C	1,2-DICHEOROETHANE  1,2-DICHEOROETHENE, TOTAL	540-59-0	UG_L	1	U
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U
8260C	1,3-DICHLOROPROPANE	541-73-1	UG_L	0.5	U
8260C	1,4-DICHLOROBENZENE	106-46-7	UG L	0.5	U
8260C 8260C	2-BUTANONE	78-93-3	UG_L UG L	2.5	U
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U
8260C 8260C	ACETONE	67-64-1	UG_L UG L	2.5	U
8260C 8260C	BENZENE	71-43-2	UG_L	0.5	U
		1			U
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U
8260C	BROMOMETHANE	74-83-9	UG_L	1	U
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5 0.5	U
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L		U
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5 1	U
8260C	CHLOROETHANE	75-00-3	UG_L		U
8260C	CHLOROFORM	67-66-3	UG_L	0.5	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U
8260C	O-XYLENE	95-47-6	UG_L	0.5	U
8260C	STYRENE	100-42-5	UG_L	0.5	U
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U
8260C	TOLUENE	108-88-3	UG_L	0.5	U
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.84	J
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U
8270D	1,4-DIOXANE	123-91-1	UG_L	1.2	

		Sample Delivery	Lab ID	TH089 TH0899	-3
		Samp	nple ID le Date le Type	TRIP BLANK_1 12/30/20 Trip Bla	)14
Method	Analyte	CAS No	Units	Result	Qual
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	Ū
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U
8260C	1,1-DICHLOROETHENE	75-35-4	UG L	0.5	U
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U
8260C	1,2-DIBROMOETHANE	106-93-4	UG L	0.5	U
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U
8260C	1,2-DICHLOROETHANE	107-06-2	UG L	0.5	U
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG L	1	U
8260C	1,2-DICHLOROPROPANE	78-87-5	UG L	0.5	U
8260C	1,3-DICHLOROBENZENE	541-73-1	UG L	0.5	Ū
8260C	1,4-DICHLOROBENZENE	106-46-7	UG L	0.5	Ū
8260C	2-BUTANONE	78-93-3	UG L	2.5	Ū
8260C	2-HEXANONE	591-78-6	UG L	2.5	Ū
8260C	4-METHYL-2-PENTANONE	108-10-1	UG L	2.5	Ū
8260C	ACETONE	67-64-1	UG L	2.5	Ū
8260C	BENZENE	71-43-2	UG_L	0.5	U
8260C	BROMODICHLOROMETHANE	75-27-4	UG L	0.5	Ū
8260C	BROMOFORM	75-25-2	UG_L	0.5	Ū
8260C	BROMOMETHANE	74-83-9	UG_L	1	U
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	Ū
8260C	CARBON TETRACHLORIDE	56-23-5	UG L	0.5	Ū
8260C	CHLOROBENZENE	108-90-7	UG L	0.5	U
8260C	CHLOROETHANE	75-00-3	UG_L	1	T Ū
8260C	CHLOROFORM	67-66-3	UG L	0.5	Ū
8260C	CHLOROMETHANE	74-87-3	UG L	1	Ū
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	Ū
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG L	0.5	U
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	Ü
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG L	0.5	Ü
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	Ü
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	Ü
8260C	METHYL ACETATE	79-20-9	UG L	0.75	U
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	Ū
8260C	O-XYLENE	95-47-6	UG_L	0.5	U
8260C	STYRENE	100-42-5	UG_L	0.5	U
8260C	TETRACHLOROETHENE	127-18-4	UG L	0.5	U
8260C	TOLUENE	108-88-3	UG_L	0.5	U
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG L	0.5	U
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U
8270D	1,4-DIOXANE	123-91-1	UG_L	NA	<del>                                     </del>
02/00	1,T-DIOAANL	172-21-1	L UG_L	IVA	

Notes:

ID Identification = UG_L = Micrograms per liter

Qual = Final qualifier

Ű =

The analyte was analyzed for, but was not detected above the reported quantitation limit. The analyte was positively identified; the associated numerical value is the approximate concentration J

of the analyte in the sample.

NA Analyte not analyzed =

Section 6

Survey

